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BRITISH MEDICAL JOURNAL

LONDON SATURDAY JANUARY 20 1945

AERIAL INFECTION*

BY

MAURICE MITMAN, M.D., M.R.C.P., D.P.H.

Medical Superintendent, L.C.C. River Hospitals, Joyce Green

For many years it was widely held that smallpox could be conveyed for a mile or more by aerial convection, and there are still some who hold this view. It is now believed that alleged instances of long-distance transmission do not bear critical examination: some fault in isolation technique allows the disease to be conveyed by undetected vectors. But aerial convection should not be dismissed too lightly, for phytopathology provides abundant evidence of long-distance dissemination of plant pathogens.

Extramural Aerobiology

The atmosphere contains vast numbers of living and dead particles derived from, and dependent upon the nature of, the soil, its flora and fauna. Many seeds and pollens are specially adapted for aerial transmission; smaller living particles such as fungi, spores, bacteria, and viruses need no such adaptation to remain suspended. The number remaining air-borne depends on such meteorological factors as the vertical and horizontal movements of the air, and upon precipitation, which in turn is governed by size, shape, and density of the particles. Viability depends on the nature of the particle, its ability to survive desiccation, extremes of temperature, and the lethal effect of radiation; in this connexion the protection provided by the non-living particle on which organisms are often carried is of some importance. This state of suspension of particles and their rate of settling are worth closer examination.

Because of the resistance of the air, particles do not fall with increasing velocity, but reach a constant velocity when a balance is struck between accelerating and resisting forces. Stokes's law expresses the constant velocity of descent of a small suspended sphere in terms of its radius and density, and the density and viscosity of the fluid medium through which it is falling. In perfectly still air the rate of fall of, say, a staphylococcus 1 micron in diameter (i.e., 1/1000 mm.) would be about 1 cm. in 5 minutes; and of a small-sized droplet of mucus 50 μ in diameter about 18 in. a minute. In the presence of a steady wind with a velocity of 10 miles an hour the staphylococcus would be carried for a distance of over 900 miles before reaching the earth from a height of 10 metres; the 50 μ droplet would be carried for a third of a mile. If there were a rising current of air with a velocity in excess of the fall the particles would be carried up—the smallest to great heights. The air for a mile up contains vast numbers of bacteria and spores; above two miles the number decreases rapidly, but Armstrong (1936) found them in the stratosphere 70,000 ft. up. Over large masses of water the number of terrigenous organisms decreases rapidly, but specimens have been collected 130 miles out to sea; on the other hand, viable marine organisms have been collected 30 miles inland. Organisms are present in rain and have been found in falling snow in Antarctica—far from their place of origin. There is an aerial cleansing action in precipitation which is worth remembering. Climatic factors, then, govern the transport of aerial organisms; indeed, meteorological investigations are of the utmost importance in the epidemiology of some plant diseases. Wind plays a great part: the spores of wheat-stem rust, a destructive fungous disease, have been carried in large numbers for such enormous distances as 1,000 miles in such a short time as 48 hours, to give rise to outbreaks of rust a week or 10 days later (Stakman, 1942). Jacob (1940) maintained that the horizontal distance over which micro-organisms can be transported is almost limitless, although their effective range is determined by their ability to survive. Terrigenous organisms of the air are remarkably resistant. They survive exposure to direct sunlight, heat, and dryness for days or weeks, although, paradoxically, they die rapidly on exposure to sunlight after isolation in the laboratory. The effect of humidity on survival is disputed: Wells (1936) found ultra-violet radiation to be 10 to 20 times more germicidal in dry air than in humid air, but Renschler (1940) decided that relative humidity does not increase the resistance of air-borne bacteria. There is, then, no reason why human pathogens should not be carried over considerable distances; but as they have never been recovered from the upper air or marine air, the inference is that they do not long survive exposure. Compare the absence of pathogenic bacteria over the sea with pollen grains, which may be found hundreds of miles from land in numbers in inverse ratio to the distance from the source.

Intramural Infections

This brings me to the first important point I want to stress, which is that, in my opinion, most human respiratory infections take place indoors. Such diseases are still the greatest cause of morbidity and mortality, and if we can be sure that they are always intramural events we can direct our energies for their control along narrower channels.

That pestilential air was a vehicle of contagion and infection was believed hundreds of years before the germ theory of disease was propounded. Perhaps the most surprising period was the first 35 or 40 years of this century, during which time the theory of air-borne diseases was practically abandoned. It started with Flügge's (1897, 1899) description of infectious droplets. They explained so many problems of contact infection that they came to be accepted as the mode of transmission of most respiratory infections. Since droplets rapidly fall to the ground within a few feet of their source it was assumed that the infector and the infectee had always to be in close proximity. Certainly for most of my professional life fever practice was based on the hypothesis that practically all cross-infections were attributable to hands or droplets, although the behaviour of chickenpox seemed to contradict this from time to time; smallpox, of course, was in a class by itself. Not until Wells and Wells's (1936) exposition of droplet nuclei did "aerial infection" reappear.

Now that the term is reintroduced we must be clear what we mean by it. Long-distance aerial transmission is of course excluded, but there has been a tendency to exclude droplet infection also, limiting the term "air-borne infections" to those occurring more than 4 ft. from the source (Cruickshank, 1940). Our terminology of the modes of infection is confused and requires clarification. The average examinee states that direct

* Presidential address given to the Fever Group, Society of Medical Officers of Health, on Nov. 24, 1944.

contact is the commonest mode of spread of infectious diseases, but has a very hazy conception of what the term means; when pressed it usually transpires that close proximity to the patient in time and space is meant, not contact in the sense of touching. I should like "contact" restricted to "touching," but I doubt if it could be displaced from its use as a noun to indicate a person exposed to infection. "Aerial infection" should embrace all those modes of transmission in which the path of the infective agent lies through the air—those which pass through a circle in Fig. 1. Droplets, their nuclei,

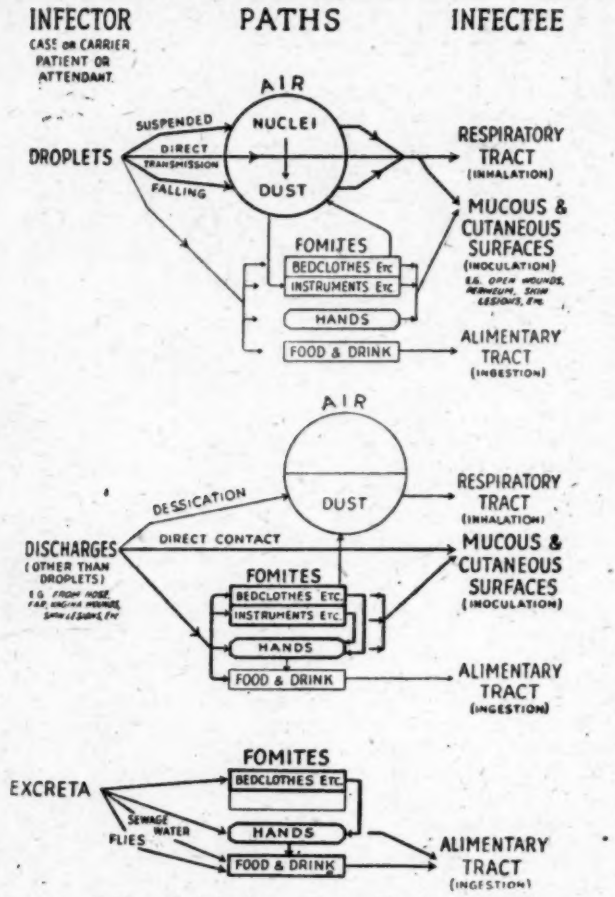

FIG. 1.—Paths of infection. (From Harries and Mitman's *Clinical Practice in Infectious Diseases*, 1944.)

dust, and direct discharges may pollute the air. In the case of droplets the infection is transmitted immediately to the infectee; with the others there is not necessarily this proximity in time and space. "Direct infection" or, if you prefer to retain the term, "direct contact" could then be used for transmissions which occur when infector and infectee touch, as in kissing, copulation, contact with discharges or the infected hands of an attendant. "Indirect infection" by mediate means implies the contamination of inanimate objects such as fomites and food (those in rectangles in the diagram) and their conveyance, sometimes at a much later date, to the infectee, who may be a considerable distance away.

Droplets Expelled by Sneezing

To me, one of the most surprising disclosures was the extent to which sneezing adds to the bacterial load of a room. Compared with the gentle bacterial showers which coughing, talking, and laughing bring, sneezing contributes veritable intramural storms. Another unexpected revelation was the origin of the droplets expelled during sneezing: photography makes it clear that they are almost all derived from the mouth, and few or none from the nose. After a sudden inspiration, often with extension of the head, the forcible expiration begins with a quick flexion of the head, a narrowing of the mouth, and the expiration of air at high speed over the secretions of the mouth and pharynx, which are atomized and forced out through the narrowed orifice at a maximum jet velocity of 46 metres or 152 ft. per sec. The duration of the sneeze is about 1/10 of a second. The atomization is more efficient—i.e., the droplets become smaller—as the velocity of the air stream increases and the size of the orifice decreases; among other factors influencing size of droplets are surface tension, viscosity, particulate inclusions, and evaporation. Droplets vary from 7 μ to 1,000 μ or more, but commonly two-thirds of them are smaller than 100 μ (i.e., 1/10 mm.). This is an important figure, because Wells (1934) considers 100 μ to 200 μ as the dividing-line between droplets likely to fall and those likely to remain suspended.

Bourdillon and Lidwell (1941) estimated the number expelled by a vigorous sneeze at 100,000, but Jennison (1942) gives an average figure of 20,000, with a low limit of 4,600 for a weak, stifled sneeze. These figures are enormously higher than those for coughing and talking. In coughing, the droplets are produced chiefly in the pharynx, and only a few dozen or a few hundred escape because the mouth is kept open. Flügge (1921) also distinguished bronchial droplets expelled during coughing from oral ones. In talking, the number of droplets expelled depends on the consonant enunciated: explosives such as "p" and "t" cause a few hundred, and vowels practically none. Theoretically, a particle 1,000 μ (or 1 mm.) in diameter ejected from the mouth with a velocity of 152 ft. per sec. will reach the floor 15 ft. away; the smaller the particle the less its kinetic energy and the shorter the distance it will go. Using the technique of flash photography, Jennison (1941) showed that few of the particles from a sneeze fell more than 2 or 3 ft. away. Many remained air-borne. The smaller the droplet the more easily was it suspended. In this connexion it is of great importance to appreciate that droplets become much smaller after expulsion. Within a quarter of a second a droplet of water 150 μ in diameter is completely evaporated in still air (Jennison, 1942). As most sneezed droplets are smaller than this it follows that within a fraction of a second most of them have evaporated to sizes which permit them to remain suspended as droplet nuclei.

I have not been able to find a definite statement as to the size of a droplet nucleus, but I would infer it to be less than 5 μ, each particle consisting of individual bacteria or minute masses of organisms or viruses on a small quantity of the vehicle. Bacteria in the air act as condensation nuclei, and the vehicle is usually a film of water, the thickness of which depends on the humidity of the air (ZoBell, 1942). Wright (1940) says the whole nucleus is very little larger than the included bacteria or other particles. To support a droplet 10 μ in diameter an air current with an upward velocity of less than 1 ft. per minute is required. As the average movement in a naturally ventilated room is about 25 ft. per minute adequate lifting force is available for most small droplets which are readily dispersed throughout the room by convection currents. The deposition of suspended particles on to the floor takes place not at a constant rate but at a geometrically decreasing one: about 16% of air-borne bacteria are still suspended 8 hours after their introduction (Phelps, 1942).

Another point of great interest is the site in the respiratory tract on which inhaled particles are deposited. Hatch (1942) maintains that infection cannot gain entrance to the deepest part of the tract unless the particles carrying the organisms are below a certain minimum size. The larger ones are caught in the nose and upper respiratory tract and are removed by ciliary action; a number of the smaller ones manage to reach the alveoli of the lungs. While droplets can infect the upper respiratory tract, only droplet nuclei, he maintains, can cause pulmonary infection. Dust clouds raised by sweeping have a rapid settling rate, and probably few such particles reach the alveoli. By contrast, the average diameter of dust particles normally suspended (as distinct from those raised) is smaller than a bacterium, and Hatch (1942) thinks the idea of bacteria being attached to such particles is erroneous. It is also important to maintain a proper perspective of the degree of contamination of droplets and dust. Although the total number of organisms of all types is comparable with the number of droplets, specific pathogens are relatively few. As for dust particles, their number is enormously in excess of the number of bacteria. Yaglou and Wilson (1942) counted 1,000,000 dust particles per cu. ft. of air as compared with two bacteria

Counts in the open have shown one micro-organism per 100 or more dust particles.

Interchange of Respiratory Flora

In contrast to extramural purity there is abundant evidence of pollution of intramural air by the nasopharyngeal organisms of human occupants (*vide* Harries and Mitman, 1944). The greater the number of occupants the higher the bacterial counts. It has long been recognized that overcrowding promotes infection, but it is not so well known that a fourfold increase in ventilation will reduce the count of an overcrowded room by only 21%, whereas if the occupants are few in number the same air exchange will reduce the count by 65% (Yaglou and Wilson, 1942).

I have for long regarded overcrowded public transport vehicles as the most fruitful venue for the interchange of respiratory flora. The Government's slogan should have been "Is your *dangerous* journey really necessary?" for the flying droplet is much more lethal than the flying bomb. In a recent Scottish White Paper on the distribution of new houses it was stated that failure to link housing with industry had been the most serious error in general housing distribution policy in the inter-war years. I agree, and when houses of the future are sited near places of work there will be eliminated those expensive, exhausting, time-consuming, and health-destroying journeys which take place in overcrowded transport vehicles. A cinema I regard as much safer; overcrowding is forbidden, not for hygienic reasons but because of fire risk—a rare contingency, but one for which expensive allowance is made, since a single conflagration is so much more apparent than a thousand inflammations. I propose to say little on the other factors which add to the bacterial load of a room. The general cleanliness of a room, the degree and nature of the occupants' activities, and the amount of respiratory infection interest us particularly, for they are responsible for the heavy bacterial load of hospital air.

I would like to say a few words about controlling the rate of additions of organisms to a room. The public have responded well to the Ministry of Health's propaganda for respiratory hygiene. The use of the pocket-handkerchief during coughing and sneezing is more widespread than it has ever been. It is impossible to measure the effect of this one change when so many others are taking place simultaneously, but I believe it has materially influenced the incidence of respiratory disease. I might add that I am not particularly fond of the washable pocket-handkerchief, but I do not see a satisfactory substitute yet. Nor do I like the hospital blanket, and I look forward to the day when blankets are no longer made. Despite the reports of the success of oiling bedclothes and floors, I am not greatly impressed by those results with which I am personally familiar, and the method is not free from drawbacks, because some oils used are dermatitic. So long as this possibility remains I am sure the method will not be widely used. Covers for blankets are a compromise of which I have no experience. I was glad, however, to read an account by Chapple (1942) of an infants' ward with a special air-conditioned annexe for premature infants. In the incubator the infant was allowed to lie naked and uncovered: not only had the blankets gone, but so had all the other bedclothes and the bed linen too. This is an advance. I have always wanted to try it on sick people, but it requires an elaborate air-conditioning system and makes nursing uncomfortable.

Air-conditioning does not ensure the degree of disinfection of the atmosphere which might be expected. Increase in the number of air changes will not necessarily reduce the bacterial count; if air is re-circulated, as it often is to conserve heat, it may even increase it. Both washing and filtration of incoming air will substantially reduce the bacterial count of an empty room, but *not*, be it noted, of an occupied one; and the more occupants the greater the pollution. If the spray water used for washing the air is re-circulated the bacterial load may actually increase; for this reason disinfectants are occasionally used for washing. Ultra-violet radiation in the mixing chambers or in the ducts of air-conditioning plants has also been used, but it has drawbacks, such as absorption of the radiation by the walls and interference with the efficiency of the lamps by dust.

Masks I cannot dwell upon: the subject is too big and was discussed recently by Bourdillon. I favour the more extensive use of masks, but am satisfied that an efficient and comfortable one has not yet been devised.

Germicidal Radiation

The oldest method of eliminating intramural infection of the air is by ordinary ventilation. Wells (1936) laid down standards of what he calls sanitary ventilation and maintains that good ventilation cannot be obtained by ordinary methods because the number of turnovers required (100–500 per hour, according to him) is impossible by ordinary or mechanical means. He therefore introduced irradiation of the upper air with ultra-violet light with the object of destroying as many bacteria as would be removed by good sanitary ventilation. McKhann *et al.* (1938) first tried U.V.R. across a corridor as a barrier to infection between two contiguous rooms. Since then a considerable literature has appeared. The method has been much more extensively used in America than here, where Andrewes (1940) reported adversely upon it because of its ineffectiveness in the presence of dust. Nevertheless, experimental and clinical reports are impressive. Wells (1943) reported a marked fall in the incidence of measles and chickenpox over periods of 3 to 6 years in three schools with irradiated classrooms. In infants' homes Barenberg *et al.* (1942) and Rosenstern (1942) obtained considerable reductions in respiratory cross-infections, as did del Mundo and McKhann (1941) in an infants' hospital. Hart (1942) investigated the importance of air-borne pathogenic bacteria in the operating theatre. The most rigid, aseptic, surgical technique failed to prevent contamination of some of the clean wounds. With ultra-violet irradiation he was able to secure a considerable reduction in the percentage of such infections and no deaths from wound sepsis over a period of 5½ years. He considered it the simplest and most effective method of eliminating such infections and one which could be used without evident danger to the patient or the properly protected personnel.

There is, of course, no essential difference in the management of aerial infection in operating theatres, surgical wards, or fever hospitals. The practice has appeared in this war of applying fever principles to surgical wards. It was long known from experience that it was undesirable to nurse clean and dirty surgery in the same ward. Now it is known that not only hands but air must be considered. In a busy surgical ward it is almost impossible to suspend all other activities while dressings are being changed, and in my own hospital I have been considering using a separation ward solely for dressings with the object of minimizing aerial infection. I have little doubt that a good deal of the success of the coagulation and Bunyan-bag methods of the treatment of burns and the closed-plaster treatment of wounds is due to exclusion of aerial infection.

Let me return to germicidal radiation and remind you of the position of ultra-violet rays in the electromagnetic spectrum.

Starting with the longest wave-lengths there are first wireless waves whose length is expressed in metres or centimetres; then infra-red rays and visible light measured in microns or thousandths of a millimetre; these are followed by ultra-violet, *x*- and γ-rays whose wave-lengths are expressed in ten-millionths of a millimetre—i.e., in Angström units (A.U.). The U.V. light band includes wave-lengths from 4,800 A.U. to 2,000 A.U., and the longer waves have different properties from the shorter ones—e.g., maximum pigmentation is produced at 3,850 A.U., whereas maximum germicidal action is obtained at 2,650 A.U. To obtain radiation of these different wave-lengths, different U.V. lamps are required. For germicidal effect a low-voltage, low-vapour-pressure, "cold" mercury-vapour-arc lamp is required, not the type used for ultra-violet therapy. Its main emission band is at 2,537 A.U., which is close enough to the required 2,650 A.U. to be 70% efficient (see Fig. 2). These lamps are simple, slender tubes, resembling the corresponding lighting tubes, and are as easy to change. To give an example of the rating: a common germicidal lamp has a power of 15 watts, an effective length of the burner of 15 in., an overall length in the holder of 18 in., and a tube diameter of 1 in.; the approximate lamp amperage is 0.3 and voltage 56. The temperature of the special glass for transmitting the radiation does not exceed 120° F. Such a tube gives a radiant flux of 25 $\mu W/cm^2$ at 1 metre and its average life is about 2,500 hours. Irradiation of the upper half of a 4,000 cu. ft. room by one of these lamps is equivalent to 45 air changes per hour in terms of Wells's sanitary ventilation. These lamps, like

all U.V. lamps, deteriorate, and the end of the life of the tube is regarded as having occurred when the output has fallen to 66%. The limitations of U.V.R. must be accepted. U.V. lamps have practically no penetrating power, so that their efficiency is materially lowered in a dusty room. The Council of Physical Therapy of the

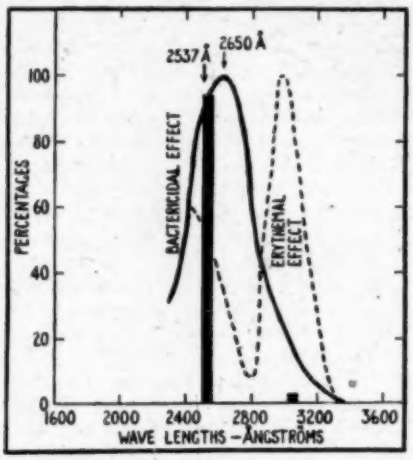

FIG. 2.—Main emission band from a germicidal lamp (2,537 A.U.), shown with the graphs of bactericidal and erythemal effects of ultra-violet radiation. (After Buttolph, 1942.)

American Medical Association has accepted such lamps for disinfecting air only in hospitals, nurseries, and operating rooms as an adjunct to other methods of asepsis; for the safety of occupants they have accepted an intensity of 20 $\mu W/cm^2$ at 1 metre from the lamp as standard.

U.V.R. for aerial disinfection can be used in three ways. By being directed upwards it produces an irradiated ceiling; natural convection currents carry the organisms upwards, where the air is disinfected by the radiation. The radiation may also be directed downwards to form "curtains" around beds and "barriers" across corridors. Lamps which combine the functions of irradiating the ceiling and producing a barrier are known as direct-indirect types in contrast to the simple indirect type directed upwards. Lamps may also be introduced into air-conditioning plant in the way I have already described.

Dynamics of Crowd Infections

Wells *et al.* (1942) attribute their success in preventing school epidemics to an improvement in the sanitary ventilation, bringing it above a critical level and thereby raising the threshold density of susceptibles. This last term was introduced by McKendrick (1940) into his interesting theory of the dynamics of crowd infections. According to him two factors govern epidemic spread—an actual density of susceptibles and a threshold density (see Fig. 3). When the number of

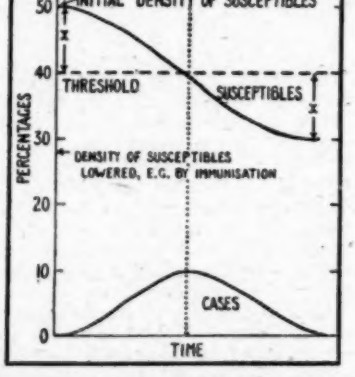

FIG. 3.—Relation of threshold density and density of susceptibles to epidemics. (After McKendrick, 1940.)

susceptibles is above the threshold an epidemic occurs. As the number of cases rises, the density of susceptibles falls. When it equals the threshold value the epidemic is at its peak. Thereafter, the density of susceptibles having fallen below the threshold, the conditions for epidemic spread no longer obtain and the outbreak exhausts itself when the density is as much below the threshold as it was originally above it. Thus the number of people affected in any outbreak is double the difference between the two densities. It will be clear that an epidemic can exhaust itself long before all the susceptibles are affected, and this agrees with experience. Anything which lowers the density of susceptibles or raises the threshold will either prevent an epidemic or limit its extent. Wells, by improving the sanitary ventilation with U.V.R., diminished the infectivity of the disease and thereby raised its threshold. This conception opens up wide possibilities. If respiratory diseases are indeed intramural events we must, when we rebuild our hospitals after the war, ensure that our architects and engineers incorporate those features which will allow full use to be made of our new knowledge of aerial infection and its control.

Summary

On physical grounds there is no reason why human pathogens should not be carried over great distances and up to considerable heights; but as they have never been recovered from upper air or marine air the inferences are that they do not long survive exposure and that most human respiratory infections take place indoors.

The theory of air-borne infection was practically abandoned for 40 years until Wells described droplet nuclei.

The term "aerial infection" includes all modes of transmission in which the path of the infective agent lies through the air.

Coughing, talking, or laughing contributes gentle bacterial showers to the air, but sneezing causes veritable intramural storms. Of the tens of thousands of droplets expelled from the mouth during a sneeze, about two-thirds remain air-borne. Only droplet nuclei and the finest dust particles are small enough to penetrate to the lungs.

Contamination of air in overcrowded rooms cannot be effectively countered. Overcrowded public transport vehicles are the worst places for the interchange of nasopharyngeal flora; when housing is more closely linked with industry many such journeys will be unnecessary. The Ministry of Health's campaign for respiratory hygiene has already influenced the amount of respiratory disease.

Hospital blankets are an abomination and the results of oiling bedclothes and floors are not impressive.

Air-conditioning does not ensure the degree of disinfection of the atmosphere which might be expected. The use of masks should be extended, but a comfortable and efficient mask has not yet been devised. Trials with germicidal ultra-violet radiation for air purification in children's homes, nurseries, hospital wards, and operating theatres are impressive. The chief limitations of this radiation are its poor penetrating power and its ineffectiveness in the presence of dust.

The new knowledge of the control of aerial infection should be incorporated in post-war rebuilding of hospitals.

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THE NATURE OF INJECTABLE LIVER EXTRACTS

A DISCUSSION ON STANDARDS OF POTENCY AND PURIFICATION

BY

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Since Minot discovered the specific effect of liver in the treatment of pernicious anaemia, and various workers subsequently prepared concentrates suitable for injection, the preparation of such concentrates on a commercial scale has been undertaken in many laboratories. Widely differing methods have been used to make these concentrates or "extracts," with the result that apparently similar products differ from one another to a remarkable degree. The terms used by manufacturers to describe these products also lack uniformity. The fundamental cause of these differences is doubtless the lack of any precise measure of anti-anaemic activity. Although many attempts have been made to devise laboratory tests, these have met with no success, and clinical trials on patients with pernicious anaemia in relapse afford at present the only practicable method of assessing activity.

It is fairly common to refer to a liver extract as being either "crude" or "refined." By the term "crude" we understand an extract that has undergone the smallest amount of processing necessary to render it safe for injection. It will therefore normally contain a comparatively large amount of material other than the active principle, and each millilitre will be derived from a comparatively small weight of original liver (2.5–10 g.).

By the term "refined" we understand an extract that has been derived from a "crude" extract through several additional stages of manufacture, which remove a large proportion of the inert material and very often a part of the active principle also. It will normally contain only a small amount of inert material, and each millilitre will be derived from a much larger weight of original liver (50–200 g.). These descriptions may be useful, but they do not express adequately the differences between extracts, and may even lead to the erroneous belief that all the extracts of any one class are similar to each other.

For several years we have devoted attention to the development of two commercial liver extracts. One would be classed as a "refined" and the other as a "crude" extract. Our investigations have also included laboratory preparation of several highly refined fractions. This work has been carried out in collaboration with a number of pathologists, to whom we are indebted for the necessary clinical tests.

Certain aspects of our work may, we hope, help to clarify some of the obscurity surrounding the nature of liver extracts available to clinicians. To assist the discussion of this work we make use of an arbitrarily defined unit of activity, based on the type of clinical test most frequently used in this country.

Present Methods of Expressing Potencies of Injectable Extracts

There is as yet no standard method of expressing the potency of an extract, and statements made by manufacturers usually fall into one or other of the following three main groups: (*a*) A stated volume of the extract is derived from a stated weight of liver. (*b*) A stated volume of the extract given by injection is therapeutically equivalent to a stated weight of liver taken orally. (*c*) A stated volume of the extract produces adequate haemopoietic response.

Claims for the potencies of liver extracts in terms of the amount of liver used to prepare them (group *a*) may be very misleading, because varying losses of active principle may occur during the purification process. Thus a highly "refined" extract may contain less activity than a relatively "crude" preparation derived from the same weight of original liver. Our experience of process losses given below illustrates this.

Comparison of extracts by relating their potency to stated weights of liver taken orally (group *b*) was a useful device when injectable extracts were first coming into use. Then, most doctors' experience in treating pernicious anaemia was in terms of liver diets, and to express such a relation may have seemed important. Now that injection is the customary form of treatment this type of statement has little value, and is, moreover, misleading—first, because process losses may vary from extract to extract, and, secondly, because the relative efficacies of oral and injectable extracts are not known with any accuracy. Thus, for example, Martindale (1941) quotes a statement that liver given by injection is 20 to 40 times as effective as when given orally, while Minot and Strauss (1943) consider that the probable ratio is nearly 60 to 1.

The statement that a specific volume of an extract is capable of producing an adequate response (group *c*) clearly provides a more direct basis for the comparison of different extracts. The meaning of a statement of this nature, however, depends on what is meant by an adequate response, and the criteria adopted are not always clearly defined. Even when this has been done, comparison of different extracts may be difficult because the manufacturer may have deliberately understated the potency of his extract in order to make allowance for small batch-to-batch variations in potency.

Criteria of Satisfactory Response

All the clinical tests carried out in conjunction with our investigations have been on cases of classical pernicious anaemia not treated recently with other liver extracts or with hogs'-stomach preparations. These cases had initial red cell counts of not more than 2½ millions per c.mm. As criteria of a satisfactory response it has been required, first, that the red cells should increase over the first two weeks of treatment at least as rapidly as required by the formulae of Isaacs *et al.* (1938), Riddle (1940), and Dyke and Della Vida (1942); and, secondly, that a reticulocyte response satisfying the criteria of Minot *et al.* (1928) should be obtained.

Very occasionally we have encountered cases in which the red cells have risen satisfactorily but the reticulocyte response has not quite satisfied the criteria of Minot *et al.* (1928). In these cases the absence of a second reticulocyte response after a further injection has been taken to indicate a satisfactory initial response. Use of the term "satisfactory response" in this paper means that these conditions have been fulfilled. Thus, the criteria of Dyke and Della Vida (1942) require the following increase in red cells over the first two weeks of treatment:

Initial Red Cell Count	Increase in Red Cells
1·0 mill. per c.mm.	1·45 mill.—i.e., to 2·45 mill. per c.mm.
1·5 „ „	1·22 „ „ 2·72 „ „
2·0 „ „	1·00 „ „ 3·00 „ „

Preparation and Comparison of "Crude" and "Refined" Extracts

The material used in the preparation of both "crude" and "refined" commercial extracts discussed here is raw finely minced liver which has not been subjected to proteolytic enzyme digestion before extraction. Only the minimum of fractionation procedures necessary to make the product suitable for injection have been employed in the preparation of the "crude" extract, which has consistently given a satisfactory response on a total dose derived from 60 g. of original liver. Responses which just fail to satisfy the defined criteria have been obtained with a dose derived from 40 g. of original liver.

The original "refined" extract was prepared according to the method of Laland and Klem (1936), involving adsorption of the active principle on charcoal and its removal from the adsorbate by means of phenol; it appeared to be a product in which the concentration of solids was reasonably consistent from batch to batch. It was relatively highly purified, the extract from 100 g. of liver containing only 10 to 15 mg. of solids. The extract normally produced a satisfactory response when 4 ml., derived from 200 g. of original liver, was given in a single injection—that is, a satisfactory response was obtained by a solution containing approximately 25 mg. of solids. However, some batches did not give such a good response on this dosage, while others gave a good response with a smaller dose. The reasons for these variations in activity were traced by an extended investigation of the whole process, and they were virtually eliminated by more precise control at all stages of the fractionation. This led to the

production of batches which consistently gave satisfactory responses to a total dose of 4 c.cm., though we also had evidence that a lower dose would suffice in some cases.

The difference between the efficacy of "crude" and "refined" extracts when expressed in terms of original liver will be noted. Whereas "crude" extract derived from 60 g. of liver produced a satisfactory response, "refined" extract from nearly 200 g. of liver was required.

Any or all of three possible causes for the discrepancy might be operative. First, activity might be lost in side-fractions arising during the refining processes; secondly, activity might be destroyed in the later stages of fractionation; thirdly, the haemopoietic activity of liver extracts might be dependent on the simultaneous presence of more than one substance—as postulated, for example, by Jacobson and Subbarow (1941)—and some of these other factors might be removed in the later stages of fractionation. However, investigation showed that appreciable losses of activity were in fact occurring at two stages of the process, and further research indicated a method of avoiding these losses by modifying the conditions of adsorption and elution used in the original Laland and Klem process (1936).

The product of this modified process gave a satisfactory response on a dose derived from 80 g. of liver (all of three cases tested), and the response to lower doses is now being examined. To date, one case has given a satisfactory response on a dose derived from only 60 g. of liver.

It can thus be seen that there is now no discrepancy between the response to "refined" and that to "crude" extract. Moreover, in the modified "refined" extract only 30 to 35 mg. of solids are obtained from each 100 g. of original liver, so that again approximately 25 mg. of solids will give a satisfactory response. Hence the amount of active material extracted from a given weight of liver has been markedly increased without reducing the activity per milligramme of the final extract.

Purification of Liver Extracts

We have recently prepared, by a modification of the Laland and Klem process (1936) involving selective aqueous alcoholic elution of the charcoal adsorbate, a fraction (L.E. 90B) which has produced in two cases of pernicious anaemia satisfactory responses with a total dose of only 5.5 mg. of solids; this dosage was arbitrarily given in 2 ml. of solution. The graphs showing the responses obtained in the two cases are reproduced in Figs. 1 and 2. The tests were carried out by

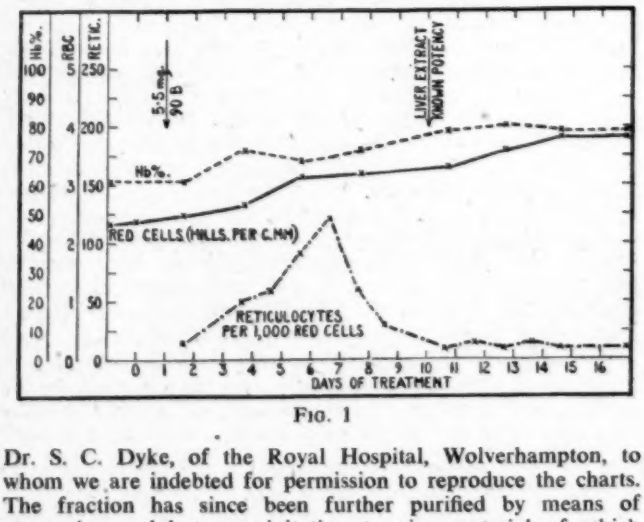

FIG. 1

Dr. S. C. Dyke, of the Royal Hospital, Wolverhampton, to whom we are indebted for permission to reproduce the charts. The fraction has since been further purified by means of ammonium sulphate precipitation to give material of which 2.8 mg. produced a response just failing to satisfy the criteria.

These fractions compare favourably with the purified fraction described by Karrer (1941), which he reported as possessing "maximal" activity in a single dose containing 15 mg. of solids and "very good" activity in a dose containing 7.5 mg. of solids.

Relation of Volume to Dosage

Some recent medical textbooks (Witts, 1941; Beaumont and Dodds, 1943) indicate, and apparently many clinicians in this country recommend, that any liver extract, no matter of what type, should be given in a certain dose volume (e.g., 2 ml. or 4 ml. twice a week) in order to produce a satisfactory remission

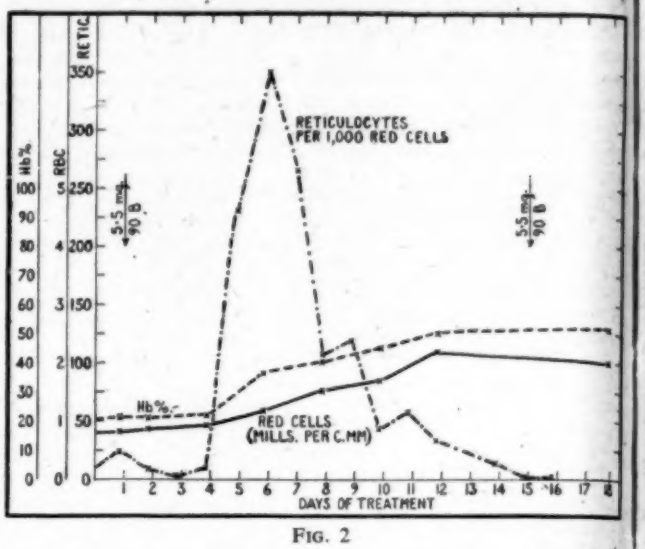

FIG. 2

of pernicious anaemia and its allied conditions. Dyke and Della Vida (1942) have adopted it as an arbitrary criterion that any liver extract producing a good response with a total dosage of less than 10 ml. over the first fortnight should be regarded as sufficiently potent for therapeutic use. However, it must be quite clear that with a product like the original "refined" extract described above, for example, the solids content (25 mg.) of 4 ml. of solution could quite easily be concentrated into 1 ml., or even 0.5 ml., or, on the other hand, be diluted to 10 ml. It was decided to make the improved "refined" extract recently developed of such a strength that 1 ml. was derived from 100 g. of liver. At this concentration 0.6 to 0.8 ml. can produce a satisfactory response, as indicated above, but the use of 1 ml. provides a margin of safety that adequately covers any small batch-to-batch variations of potency and any losses on storage. This could obviously have been 0.5 ml., 2 ml., or any other volume convenient for injection.

So far as we have been able to ascertain, no better initial response is likely to be obtained in a normal uncomplicated case of pernicious anaemia by giving larger doses than those necessary to produce a satisfactory response as defined above. In cases complicated by subacute combined degeneration of the spinal cord or nutritional deficiencies larger doses may, however, be required: this can usually be ascertained by careful control of the blood count throughout the period of treatment.

Unit of Activity

We have shown above that different liver extracts should not be compared either in terms of dosage by volume or in terms of the liver from which they are derived, but that the soundest basis of comparison is in terms of their therapeutic activity. Anti-anaemic activity, however, can only be measured by tests on human patients with uncomplicated pernicious anaemia, and the errors involved in such a method of assay are large. Nevertheless, such clinical tests have been adopted as an assay method, albeit a rough one, in America and Canada, and units have been defined in terms of which the activity of all liver extracts must be expressed before they are marketed.

The American (*U.S.P.*) unit depends on the response given by small daily injections of the extract over a period of 15 days. This response is normally assessed on not fewer than three patients by the U.S.P. Advisory Board, who then assign a unitage to the extract. Thus, if a daily injection of 1/15 ml. produces a response considered satisfactory, the extract is given a rating of 15 units per ml. (*J. Amer. pharm. Ass.*, 1940).

The Canadian unit, only recently adopted, depends on the response produced over the first four weeks of treatment by weekly injections. The unit is defined as one-seventh of the

weekly dose of extract required to produce a satisfactory response. Thus, if weekly injections of 0.5 ml. will produce a satisfactory response, the extract is given a rating of 14 units per ml.

For the purpose of expressing relative potencies of extracts in this paper we define an arbitrary unit based on the method of testing more generally used in this country. This unit depends on the production of a satisfactory response over 2 weeks following one or more initial injections given within the first 2 days of treatment. Like the Canadian unit, it is expressed as the number of days of treatment (14) divided by the number of millilitres of extract given. Thus, if a single injection of 1 ml. of an extract produces a satisfactory response over the whole of the first two weeks it is said to contain at least 14 units per ml. If another extract has been shown to produce a satisfactory response on injection of (say) 2 ml. on day 1, followed by a further 2 ml. on day 2, it is said to contain at least 14 divided by $4 = 3\frac{1}{2}$ units per ml. If it can be assumed that a number of small daily injections are utilized as efficiently as the same total dosage given in one or two larger injections at the beginning of treatment, the arbitrary unit defined above is approximately equivalent to the *U.S.P.* unit.

If it can be found possible to give official recognition to some unit similar to that which we have defined we believe it will be of considerable help both to the clinician and to the manufacturer.

Purification Index

Having expressed the potencies of different extracts in terms of a common unit, the relative degrees of purification can be readily examined by determining their content of solids. A convenient "purification index" (P.I.) is obtained by dividing the number of units of activity in each millilitre of the extract by the solids content, expressed as fractions of 1 g. per ml. Such a method of expressing degrees of purification in terms of arbitrarily defined units per unit weight of solids has long been adopted with other biologically active substances before their isolation in pure form—e.g., several of the vitamins, enzymes, pituitary hormones, antibiotics. In these instances, however, potency could be determined by animal assay or microbiological assay, and by increasing the number of replicates used a more or less accurate estimate of the activity could be obtained. Liver extracts, on the other hand, can be assayed only on human cases, of which but a limited number are available; in consequence, the values so obtained will be subject to considerable experimental error, but they will at least indicate the relative orders of purity of the extracts. A few such figures, calculated from known data, are given below as examples:

Extract	Approx. Minimum Dose giving Optimal Response (ml.)	Units/ml.	Total Solids Content (g./ml.)	Purification Index (units/g.)
Original refined extract	2–4	3·5–7	0·0075	500–1,000
Modified refined extract	0·6–0·8	17·5–24	0·035	500–700
Crude extract	4–6	2·3–3·5	0·25	9–14
American (15 *U.S.P.*)*	1	14·0	0·18	Ca. 80
" " *	1	14·0	0·075	Ca. 200
Experimental fraction (L.E. 90B)	2	7·0	0·0027	Ca. 2,600

*These figures are based on the assumption that the *U.S.P.* unit is approximately equal to the unit we have defined.

The difference between the "refined" and "crude" extracts is brought out clearly in the above table, "crude" extracts having purification indices of the order of 10, and "refined" extracts (though differing among themselves to a remarkable degree) indices of the order of 100 or more.

The preparation of Dakin and West (1935) has been referred to, though not by the authors themselves, as though it were the actual pure anti-anaemic factor. This, however, gave, at a dose of 80 mg., responses that, judged from the published clinical data, may be regarded as satisfactory in the sense used in this paper. Now, this dose contains approximately 14 units of activity, and is therefore equivalent to a purification index of the order of 200. It seems obvious, from the data obtained with our fraction 90B, that the pure factor must have a purification index of at least 2,500.

General application of this method of expressing the activity of liver fractions would allow papers describing the purification of the active principle to be more critically compared. This presupposes, however, the existence of a common unit of activity.

Maintenance

It is usually found that the blood of patients who respond satisfactorily to an adequate initial dose is brought rapidly to normal by fortnightly injections equal in amount to the initial injection. Presumably, therefore, the average daily requirement during this phase of treatment is 1 unit. The dosage required for the maintenance of normal red-blood-cell levels is very much more difficult to assess. Before any reliable conclusions can be drawn it is necessary to have observations on a large group of cases carefully controlled over a period of several years.

While it may be argued that the ease and cheapness of treatment with modern liver extracts make the measurement of minimal maintenance requirements a matter of somewhat academic importance, such an investigation might well lead to data of considerable practical value. For example, it is not impossible that the incidence of systemic reactions to the injection of liver extracts may be related to prolonged administration of excessive doses. Further, in this country there is a body of opinion that "crude" extracts have advantages over "refined" extracts for maintenance, though recent American publications have claimed that "refined" extracts are as effective as "crude" extracts both for maintenance and for initial treatment (Evans and Jordan, 1941; Murphy and Howard, 1939).

An investigation of minimal maintenance requirements of the "crude" extract, referred to above, has been reported to us by Dr. J. Mills, of the Royal Berkshire Hospital, Reading, and we gratefully acknowledge his permission to summarize his findings here. In a group of 75 patients with pernicious anaemia, a few of whom showed neurological symptoms, about 90% were maintained at levels of 5 million red cells per c.mm. and 100% haemoglobin for periods ranging from 6 months to more than 2 years on a dose derived from 20 g. of original liver (2 ml.), given at intervals of 4 weeks. Those not maintained by this dosage have, without exception, been satisfactorily maintained by a dose derived from 40 g. of original liver (4 ml.) every four weeks, for periods ranging from 8 to 18 months. Hence a dose of the "crude" extract containing approximately 5 units of activity per month appears to satisfy the need of most patients, while one of 9 units per month satisfies the needs of all.

The dose recommended by American authorities for satisfactory maintenance is usually of the order of one unit of activity per day—i.e., 28 units every 4 weeks. We have some evidence, though as yet inadequate, that a dose containing some 17 units of the newly developed "refined" extract, referred to above, is enough to keep patients' blood normal, but tests with a lower dosage have not as yet been carried out.

It is not impossible that the "crude" extract may contain factors of importance in maintenance which are not measured in tests on patients in relapse. Careful comparison of minimum maintenance requirements of "crude" and "refined" extracts in terms of units as discussed here should provide useful information on this point. Similarly, consideration on a unitage basis of dosage requirements in the treatment of the more complex macrocytic anaemias might lead to a resolution of the divergent views (Wills and Evans, 1938; Foy and Kondi, 1939; Hamilton Fairley, 1940; Trowell, 1941; Sundaram, 1944) which are at present held on the relative efficacy of "crude" and "refined" extracts.

Summary

Statements commonly used in this country to describe injectable liver extracts are criticized.

The chief differences between "crude" and "refined" injectable liver extracts and their uses in the initial treatment and maintenance of cases of pernicious anaemia are discussed.

An arbitrary unit of haemopoietic activity, and a "purification index" based on it, are defined.

Attention is drawn to some advantages which would result from the establishment of an official unit of haemopoietic activity in this country.

The relatively low order of purification of commercial "refined" liver extracts is demonstrated by the description of a laboratory

preparation capable of producing a satisfactory response on a total dose containing only 5.5 mg. of solids.

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THE PROPHYLAXIS OF RICKETS BY SINGLE MASSIVE DOSES OF VITAMIN D

BY

DAVID KRESTIN, M.D., M.R.C.P.

In an earlier paper (Krestin, 1944) it was shown that rickets still presented a problem in infant entrants to Preston war-time nurseries, for, although severe and advanced degrees of this disease were extremely rare, an early or mild variety was found in 37% of all admissions under 2 years, while in the poorer parts of the town this figure was even higher. Furthermore, it was noted that the free distribution of cod-liver oil for the infants before their admission to the nurseries did not produce any obvious reduction in the incidence of this disorder. Similarly, in a recent report by the Ministry of Health (1944) describing a widespread survey including Great Britain and Ireland, it was found that 73% of the infants with radiologically active rickets had received cod-liver oil or other vitamin D preparation for some period before the investigation, and Corner (1944) found the incidence of the disease in hospital patients actually higher in those who had previously received vitamin D supplements than in the average series. Since the antirachitic value of cod-liver oil is now beyond doubt, and has been shown to be reliable when given regularly and in large enough doses in these nurseries (Krestin, 1945), it is evident that the disappointing results obtained by these mothers in their own homes were due to irregularity of administration and inadequacy of dosage.

For these reasons it seemed desirable to investigate the possibility of a method of preventing the disorder that could be used independently of the mother and yet not require the daily attendance of the child at a clinic or medical centre.

Previous Work

Although Vollmer in 1928 (quoted by Vollmer, 1939) showed that rats which had been fed on a rachitogenic diet could be protected against rickets by a single massive dose of vitamin D, this observation was not applied clinically until 1938, when Harnapp (1938a, 1938b, 1939), in Germany, found that infants under 18 months could be protected during the winter months by single oral doses of 7.5 or 10 mg. of either vitamin D_2 or D_3 dissolved in oil. These results were soon after confirmed in that country by Schwartzer (1939), Rietschel *et al.* (1940), Hartenstein (1940), and Heisler (1940), most of whom favoured the view that, whereas 5 mg. was too small, 7.5 to 10 mg. was sufficient for the purpose, and that larger doses were unnecessary. Less constant results were obtained by Windorfer (1938) and Brockmann (1938). More recently Wolf (1943) and Rambar *et al.* (1943), in America, reported the results of using single doses of 15 mg. of "ertron," an electrically activated preparation of ergosterol; although in both cases the numbers of infants followed up for five months or more were small, the results obtained were very satisfactory.

Present Investigation and Results

This investigation concerns full-term infants and children between 2 months and 3 years of age, of average health, and showing no radiological or clinical evidence of rickets on admission to ten day and three residential wartime nurseries in Preston. All lived under similar conditions, received similar diet, and were under constant supervision. The period of observation began during the autumn of 1943, and lasted for 6 months throughout the following winter and early spring. After admission each child was clinically examined and then sent for radiographs of the lower ulnar epiphyses. A single dose of 7.5 mg. of calciferol—i.e., 300,000 i.u. of vitamin D_3 dissolved in 1 c.cm. of arachis oil—was then given by spoon after a milk feed, the amount having been measured in a graduated Record syringe. The oil was readily taken by all ages, and, except for vomiting in one small infant, was not followed by any gastro-intestinal disturbance or other unpleasant effects. Thereafter each child was clinically examined at regular intervals of 4 weeks or less, and at the end of 6 months another radiograph was taken of the wrist. Owing to the distance of the nurseries from the *x*-ray centre it was not possible, except in a few instances, to have radiographs taken at more frequent intervals. Biochemical examinations of the blood were not practicable. Throughout the period of observation no other vitamin D preparation was given, nor was any child in this series exposed to ultra-violet radiation.

About one-third of the infants had received some cod-liver oil before admission. The doses were small, and often irregularly given. As the subsequent results in these infants did not appear to differ from the results in those who had not previously received any vitamin D preparation, they are not tabulated separately.

At the same time and during a similar period of the previous year two other groups of infants and children living under exactly similar conditions and receiving the same diets were studied. One, a "control" group, received no vitamin D preparation; the other received daily doses of the Ministry of Food cod-liver oil. The results obtained in these two groups have been discussed elsewhere (Krestin, 1945), but the figures are included in the accompanying Table for comparison.

The diagnosis of rickets in these nurseries has been discussed in earlier papers. The radiographic changes at the lower ulnar epiphyses have been clearly described by Wimberger (1923), A. F. Hess (1930), and others, and so require no further discussion here. It should, however, be noted that in mild rickets of short duration obvious alterations in the appearance of the *x*-ray films may not occur, or may last for so short a time that they may be overlooked unless radiographs are taken at frequent intervals. Craniotabes—i.e., asymmetrical softening of the cranial bones in the region of the lambdoid suture—was found to be a reliable sign in infants older than 3 months, but was rarely found after the sixth month. After the fourth month the most reliable sign, when scurvy could be eliminated, was a definite enlargement of the costo-chondral junctions of the fourth to the tenth ribs. Moreover, this sign was of par-

Table showing Comparison of Results after Antirachitic Prophylaxis with Single Massive Doses of Vitamin D_3 and after Daily Doses of Cod-liver Oil, with a Control Group of Infants

Age Groups:	0 to 6 Months			6 to 12 Months			1 to 2 Years			2 to 3 Years		
	Number Examined	Developed Rickets	Remained Rickets-free	Number Examined	Developed Rickets	Remained Rickets-free	Number Examined	Developed Rickets	Remained Rickets-free	Number Examined	Developed Rickets	Remained Rickets-free
Single oral dose:												
7·5 mg. D_3 = 300,000 i.u. ..	16	2	14	27	1	26	50	0	50	44	0	44
Daily doses of M.O.F. cod-liver oil:												
1 dr. = 700–800 i.u. ..	18	12	6	—	—	—	—	—	—	—	—	—
2 dr. = 1,500 i.u. (approx.)	28	3	25	28	2	26	55	6	49	63	0	63
3 dr. = 2,100 i.u. (approx.)	—	—	—	15	0	15	11	1	10	—	—	—
4 dr. = 3,000 i.u. (approx.)	—	—	—	—	—	—	44	0	44	60	0	60
Controls (no vitamin D) ..	14	12	2	30	18	12	28	3	25	15	0	15

ticular value, since, once having appeared, it would last for weeks or months after all *x*-ray signs of activity had gone. Thus, the appearance of either of these clinical manifestations was accepted as evidence of rickets even with a normal *x*-ray picture. Similarly, even in the absence of clinical signs, the appearance of definite radiological changes was regarded as diagnostic.

The results obtained are shown in the Table. The most significant figures are those in the group under 1 year, which, as may be seen from the control series, shows the greatest liability to the disease. The figures in the 2–3-year age group are probably without significance, since the controls show that if a child living under the conditions obtaining in the nurseries can avoid the disease during the first two years of life it will probably remain free after that age even without special prophylactic treatment. Compared with infants receiving regular daily doses of cod-liver oil, the results of administration of a single massive dose of vitamin D_2 are satisfactory, the failures being 3 out of 43 infants under 12 months and 3 of the 93 infants under 2 years. Thus the claim of earlier workers in Germany and America appears to be substantiated.

Discussion

Mode of Action

Windorfer (1938) found that after a single large oral dose of vitamin D dissolved in a small amount of oil 93% was absorbed from the bowel. There is, so far, little evidence in the literature as to the exact fate of the vitamin after its absorption. By feeding large doses of this vitamin to rabbits Warkany (1936) and his colleagues (Warkany, Guest, and Grabill, 1942) were able to produce a rise in the blood level from the average normal of 50 i.u. to 2,700 i.u. in 24 hours, which was maintained for about 4 days before slowly returning to normal in 4 to 6 weeks. In human subjects they found that after stopping the daily administration of larger doses the serum level of vitamin D remained above normal for from 3 to 6 months. Further, Heymann (1936, 1937) showed that after large doses were given to rabbits the vitamin could be demonstrated in the tissues and organs for varying periods, and for as long as 12 weeks in the liver and plasma. Thus it would seem that after a single large dose the organism is able to draw on a store of this vitamin for some 8 to 12 weeks. By this time the growing animal has probably been able to lay down enough calcium at the metaphysis to last throughout the winter, though it may be advisable in the case of infants, particularly those under 1 year, to repeat the dose after 3 months if the first one was given in the autumn or winter—i.e., before the beginning of March.

Possible Disadvantages: Toxicity of Vitamin D

Except for one instance of an infant who vomited the dose and was then quite well, no ill effects of any kind were observed among those who received the single dose of 7.5 mg. This was equally true in a further series of infants with active rickets (not reported here) receiving single doses of 15 mg. (i.e., 600,000 i.u.). Further, subsequent radiographs of the non-rachitic infants did not show any noticeable increase of calcium deposition at the metaphysis. Similarly, complete freedom from unpleasant after-affects was noted by all the earlier workers referred to above.

A considerable amount of recent work has shown that most of the undesirable manifestations previously observed after relatively small doses of vitamin D were due to toxic substances produced by the over-irradiation of ergosterol. With more recent methods of preparation, these substances are not produced, and the material supplied is almost pure calciferol. With preparations of this kind, Bills and Wirick (1930) found that amounts over 4,000 times the minimal antirachitic dose were required to produce even mild manifestations of toxicity in the case of rats. Catel and Pallaske (1931) and Pallaske (1932) could find no injurious effects at necropsy after very large amounts given to goats and other animals. In infants, J. H. Hess *et al.* (1930) found that daily amounts up to 50 times the ordinary prophylactic dose could be continued for months, and up to 250 times this dose for short periods, without ill effect. Steck *et al.* (1937), after extensive work with dogs and human subjects, concluded that 20,000 i.u. per kilogramme of body weight could be given daily for indefinite periods with impunity, but with doses greater than this undesirable symptoms might follow. After amounts up to 1,000,000 i.u. given by mouth or by intramuscular injection to premature infants, Zelson (1940) failed to find evidence of damage to tissues at necropsies where death resulted from intercurrent infection. Rambar *et al.* (1943) failed to find any persistent rise in the blood levels of the calcium or phosphorus after single oral doses of 15 mg. (i.e., 600,000 i.u.). After the daily administration of from 20,000 to 40,000 i.u. for 6 months to a premature twin, however, Ross and Williams (1939) reported the appearance of anorexia, loss of weight, and vomiting, ending in death; at necropsy there were bronchopneumonia and extensive calcification of arteries, heart muscle, kidney, stomach, and lungs.

It may therefore be concluded that the amounts of vitamin D used in this study are well within the limits of safety, and that, where necessary, they could be repeated once or twice during a period of 6 months without ill effect. There is, however, some evidence that metastatic calcification may occur with much lower doses in the presence of renal disease. In such circumstances it would probably be advisable, for the present, to use the older routine of small daily doses.

Wolf (1943) states that ertron is less toxic than irradiated ergosterol. This substance is not at present available in this country.

Absence of Vitamin A from Preparation

As the preparation used in the single-dose method contained no vitamin A, these infants differed from those receiving daily cod-liver oil in that they were deprived of this added vitamin as well as of the daily supplements of oil. Although it was the general impression in the nurseries that these infants remained well and thrived satisfactorily, it was thought advisable to compare their progress as regards weight, height, and incidence of infection with the control and cod-liver-oil groups. This is shown in the diagrams. As growth is more rapid during the first year of infancy, separate diagrams are given for those under 1 year, and for those over 1 year but not exceeding 2 years, at the end of the six-months period of observation.

Weight.—It will be seen (Fig. 1) that in those over 1 year there is little difference in the average gain in weight in the three groups. Thus infants receiving no vitamin A or D or oil, and those receiving vitamin D only, seemed to thrive as well as those getting daily oil containing these vitamins. The infants

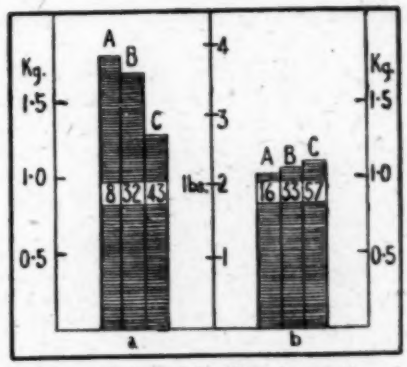

FIG. 1.—Average gain in weight after six months. A, Controls. B, After receiving single dose of vitamin D. C, After receiving daily doses of cod-liver oil. a, Under one year. b, Over one year. Figures within columns show number of infants.

under 1 year who received the daily oil appeared to gain less than the other two groups. This unexpected result may possibly be explained by diminished alimentary absorption following the daily administration of two doses of oil, since there seemed to be no reduction in the amount of feed taken by these infants.

Height.—Fig. 2 shows the average gains in height. It will be noted that neither the control nor the single-dose group show any disadvantage compared with those having the daily supplements.

Infection.—Records of all infections were kept on charts showing the duration of illness in days for each child. As the influence of age, immunity from previous attacks, and the opportunity for contact are doubtless predominating factors in the acute infectious or specific fevers, these are omitted from

consideration. For similar but somewhat different reasons, the incidence of gastro-intestinal and skin infections is also not discussed. It was thought that the average number of days of illness due to infection of the upper and lower respiratory

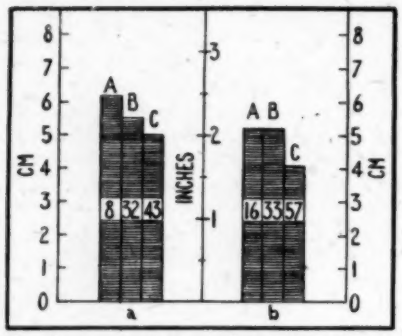

FIG. 2.—Average gain in height after six months.

tracts—i.e., nasopharyngeal, tracheo-bronchial, and pulmonary infections—would provide some guide as to the susceptibility of each group. Infection was recognized by the appearance of definite clinical manifestations, including a rise of rectal temperature to 99.6° F. or more.

The average number of days of illness for each group is shown in Fig. 3. It will be seen that there is a lack of con-

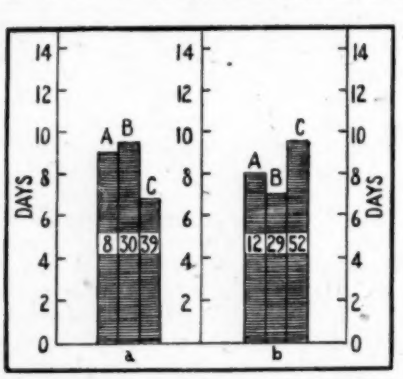

FIG. 3.—Average number of days of illness due to infection of the upper and lower respiratory tracts during period of six months.

sistency in the two age groups. In those under 1 year the cod-liver-oil group has a lower average than have the other two groups. In those over 1 year, the lowest average is found in the single-dose group. This difference cannot be explained, and is presumably due to chance.

Owing to the fact that many of the controls under 1 year developed manifestations of rickets and received treatment for this before the end of the six-months period of observation, the numbers on which the averages are based in this group are small, so that undue significance cannot be attached to them. Nevertheless, the other columns in the diagrams suggest that the infants who received the single oral dose of vitamin D were at no obvious disadvantage compared with those who received the daily cod-liver oil. This is not altogether surprising, for while retarded growth and increased liability to infection may result from gross vitamin-A deficiency produced under experimental conditions, there is no definite evidence that real benefit follows the addition of this vitamin to an already adequate diet in infants showing no signs of such deficiency. Obvious manifestations of vitamin-A deficiency are probably uncommon in infants and children living under moderately healthy conditions; none was noted in any of the entrants to these wartime nurseries, and they would not be expected to appear on the diets there given.

It should be mentioned that all infants, including the controls, received the Ministry of Food orange juice every day.

Advantages of the Method

These for the most part are obvious and require little discussion. The chief of them is that an infant can be given a single small dose of oil by a trained nurse at an out-patient clinic, welfare or other medical centre, and then need not be seen again for two or three months. The method is thus largely independent of the mother. A very considerable quantity of oil is saved, which, besides being more economical, may be a factor of importance in wartime. In the case of residential or day institutions where large numbers of infants have to be cared for, the reduction in work is greatly appreciated by the staff. Further, this method is particularly suitable for feeble infants, for those liable to gastro-intestinal disturbances, or for those who for any reason are unable to take daily doses of oily preparations. Park (1940) has drawn attention to the danger of lipoid pneumonia from aspiration of oil given frequently or in large quantities to weakly babies or those liable to vomiting.

Although this paper is concerned with healthy full-term infants, it is relevant to mention that where, ordinarily, larger amounts of vitamin D are required, as in premature babies, those recovering from marasmus or acute illness, or those who are taking thyroid, the dose with this method would require increasing and probably repeating. Thus a premature baby would probably need an initial dose of 15 mg. followed by one or two further doses of 7.5 mg. during the winter and spring months.

It is claimed by some workers (Hess and Lewis, 1933; Rietschel *et al.*, 1940; Hartenstein, 1940; and others) that for the prevention of rickets in infants vitamin D_3 is superior to D_2. The evidence for this at present, however, is not convincing. The available supply of vitamin D_3 in this country was insufficient for any large-scale investigation.

Summary and Conclusions

The prophylaxis of rickets by means of a single massive dose of vitamin D_2 given by mouth was investigated during a period of six months of the autumn, winter, and early spring in 137 infants under 3 years, and the results compared with controls who received no vitamin D preparation and infants who received daily doses of the Ministry of Food cod-liver oil.

Of 93 infants under 2 years who received one dose of 7.5 mg. (300,000 i.u.) 90 remained free from the disease throughout the period of observation.

A short review of the literature is given, and the possible disadvantages and advantages of this method are briefly discussed. The freedom from all ill effects is noted.

It is suggested that when a child first comes under observation in the late winter or spring—i.e., after the beginning of March—one dose of 7.5 mg. is probably sufficient. If first seen before this time, it would probably be wise to repeat the dose after 3 months.

Premature infants, those taking thyroid, and those growing rapidly after marasmus or an acute illness may require double the above doses, possibly repeated at shorter intervals.

I am greatly indebted to Dr. F. A. Sharpe, medical officer of health, for allowing me to carry out this investigation, and for permission to publish this paper; to Dr. J. Laurie, medical superintendent of Sharoe Green Hospital, for the *x*-ray facilities; and to Miss P. Wright and the matrons of the nurseries for their zealous co-operation. I wish also to thank Glaxo Laboratories Ltd. for the generous supply of the vitamin used.

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PROPHYLAXIS OF RESPIRATORY TRACT INFECTIONS WITH SULPHANILAMIDE LOZENGES

BY

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Percy Garson (1943) claimed that a significant decrease in the incidence of infections of the upper respiratory tract could be effected by the administration of small amounts of sulphanilamide in lozenges. In view of its possible value in the Army, it was decided to investigate this method of prophylaxis on a larger scale than Garson had found possible. Messrs. Boots Pure Drug Co. Ltd. kindly supplied two types of lozenges. One (yellow) consisted of 2 g. of lozenge basis, and the other (red) of the same weight of basis in which was incorporated 0.065 g. of sulphanilamide.

Individuals vary greatly in the time for which a lozenge could be made to last, the average being about 20 minutes. An estimate of the concentration of sulphanilamide in the saliva of a subject sucking a red lozenge which lasted for 20 minutes was made by pooling four samples of saliva ejected at 5-minute intervals. The concentration of sulphanilamide was found to be 300 mg. per 100 c.cm. of saliva. This might be expected to have considerable local action, but it is improbable that the dose (0.325 g.) swallowed in 24 hours could have any general action.

The population used in the investigation consisted of 1,200 recruits receiving instruction in a primary training centre (P.T.C.). These men had within a few weeks been transferred from civil to Army life, and experience has shown that infections of the respiratory tract very often occur soon after exposure to the communal existence of the Army. The recruit normally spends six weeks in the P.T.C., and while there belongs to one of three companies—A, B, or C. At the beginning of his training he is allocated to one of the six barrack-rooms which accommodate the personnel of each company. The investigation dealt with five groups of men, each from a separate intake, and, to secure uniformity, each company was included at least once and the investigation covered various stages of the six-weeks training period. The men in each barrack-room were divided into two sections, to one of which red (sulphanilamide) and to the other yellow (control) lozenges were administered for a period of 16 days. Table I gives the essential facts about the composition of the population investigated.

TABLE I

Group	Company	Month	Week of Training in which Investigation Began	Number of Men on Each Type of Lozenge			
				1–9 Days		10–16 Days	
				Sulpha	Control	Sulpha	Control
1	A	March	Fifth	103	103	89	85
2	C	April	Third	136	139	120	126
3	B	May	,,	119	124	96	107
4	A	June	,,	119	114	114	115
5	C	June	First	105	131	107	121
			Totals ..	582	611	526	554

Total numbers { Sulphanilamide .. 1,108 / Control .. .. 1,165 } 2,273

Lozenges were distributed by an N.C.O. at 06.30, 11.00, 13.30, 17.00, and 20.30 hours daily for 16 days. The men were instructed to begin to suck the lozenges immediately they were received, to make them last as long as possible, and to swallow their saliva while they remained in the mouth. The medical officer (A. F. H.) who was completely in control of the collection of data did not know, until the investigation had been concluded, which type of lozenge contained sulphanilamide. The men knew nothing of the composition of the lozenges.

On the ninth and again on the sixteenth day after administration of lozenges had started, the company was assembled and divided into two groups—red and yellow. Only men who had regularly taken lozenges during the preceding 9 or 7 days and were present on parade on the appropriate day were included in the investigation. Owing to postings, absences, defaulters, etc., not every man included in the first period was included in the second, but the great majority were. A very few men included in the second period had not been included in the first because they had been absent from the first parade.

The information abstracted in Table II was derived from the answers given by the men to carefully designed questions. It represents, therefore, the opinions of the men concerned on their symptoms.

Table III gives details of the illnesses of the men who reported sick with signs or symptoms of respiratory tract infections during a period of 14 days starting two days after administration of lozenges had begun. Apart from temperatures and the results of auscultation, the data were supplied by the men themselves in response to carefully designed questions.

TABLE II.—*Symptoms Reported at End of 9 and of 16 Days*

	Red (Sulphanilamide Group)	Yellow (Control Group)
Number of men in group ..	1,108	1,165
Slight cough	585	493
Severe ,, ...	70	121
Nose blocked	228	249
,, running	303	342
Painful to speak	95	92
,, ,, swallow	70	71
Malaise	81	91
Fresh or increasing cold during previous 7 days	237	351
Without cold	398	396

TABLE III.—*Men Reporting Sick during Last 14 Days of Administration of Lozenges*

	Red (Sulphanilamide Group)	Yellow (Control Group)
Average strength	555	584
Number reported sick	60	66
Temperature over 99°	10	6
Rhonchi at one or both bases ..	6	4
Cough	55	55
Headache severe	6	6
,, moderate	7	14
,, slight	3	6
Nose blocked	26	24
,, running	21	31
Malaise	13	12
Painful to speak	23	21
,, ,, swallow	21	30
Duration of cold before reporting sick:		
0–7 days	51	52
8–14 days	8	11

Discussion

The only figures showing statistically significant differences in the two groups (Table II) are those for coughs (slight and severe) and for fresh or increasing colds during the previous 7 days. If we are prepared to place complete reliance on statistical theory, we are forced to believe that the administration of sulphanilamide in the form of lozenges reduces the incidence of severe coughs and of fresh or increasing colds, but we are equally forced to believe that it increases the incidence of slight coughs.

We prefer—as we believe most of our readers will—to conclude that the protection against infections of the respiratory tract afforded by sulphanilamide lozenges, if indeed there is any such protection, is so trifling as to make the method of prophylaxis not worth the trouble, expense, and slight risk involved.

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H. F. Fernandes (*Tubercle*, 1944, **25**, 82) records six illustrative cases of bilateral tuberculous effusion (five of them fatal) in patients aged from 15 to 37 which occurred among 2,012 admissions to the Derbyshire Sanatorium during the period 1938 to 1944. Five showed radiological evidence of miliary tubercle during the final stage of fluid resolution, and one developed a tuberculous spine some time afterwards.

RECOVERY FROM DIABETIC COMA OF ABRUPT ONSET WITH EXTREME HYPERGLYCAEMIA

BY

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Exceptionally high blood sugars in coma have been recorded both in this country and in America. The highest figures quoted by Joslin (*Treatment of Diabetes Mellitus*, 7th ed., Henry Kimpton) are 1,850 mg. per 100 c.cm. in a case of Dillon and Dyer's which recovered, and 2,060 mg. in a fatal case reported by Lawrence. The following case in which the blood sugar rose to 1,960 mg., occurring in a young woman with no previous history of diabetes, is of interest.

Case History

A married woman aged 31 was admitted to King's College Hospital on June 28 as an air-raid casualty. She was quite conscious, had slight superficial wounds of the scalp and left thumb, and, although not shocked, appeared to be anxious. A radiograph of the skull showed no fracture. The routine ward report states that no reducing substances or ketone bodies were found in her urine, but, as the ward was extremely busy at the time, it is not possible to be absolutely certain of this point. On the 29th she vomited her breakfast, and during the day passed 82 oz. of urine, which was not tested. During the following night the nurse reported that the patient had collapsed suddenly with a low-volume pulse, but had recovered rapidly without treatment.

On the morning of the 30th she vomited again and became restless and increasingly drowsy. The knee- and ankle-jerks were absent, but her disks were normal, and the C.S.F. was normal and under normal pressure. During the afternoon she became increasingly restless, then delirious, and finally comatose. At that time she was extremely dehydrated, a smell of acetone was noticed in her breath, and she had air hunger. Up to midday she had passed 51 oz. of urine, but subsequently had to be catheterized. At 6 p.m. her urine was found to be loaded with sugar and ketone bodies, and to have a trace of albumin; chlorides were absent. She was immediately given 60 units of insulin subcutaneously, and a 4% glucose-saline intravenous drip was started. Blood was taken from her ear by capillary pipette, but owing to the dehydration a small amount clotted and the blood-sugar reading of 998 mg. per 100 c.cm., which was estimated by the Folin-Wu method, was certainly inaccurate. 100 units of insulin were given intravenously at about 6.30 p.m., and the glucose-saline drip was changed to one of normal saline. At 7 p.m. blood from the ear was taken easily and the blood-sugar reading was 1,960 mg. per 100 c.cm.

The following Table shows the response of the patient to treatment in the next 48 hours. The restless mania was very troublesome, and has occurred occasionally in other cases of diabetic coma treated in this clinic.

Date and Time	Urine		Blood Sugar (mg./100 c.cm.)	Insulin (Units)	Remarks
	B.	R.			
June 30 6 p.m.	++++	+++	? 998	60 100 i.v.	Eye tension very low. 4% G.S. drip started. Very slow.
7 p.m.			1,960	200 i.v. 200	Changed to normal saline
9 p.m.			1,960		Becoming maniacal. Less air hunger
12 p.m.	++++	+			Very noisy. Sod. amytal 7½ gr. i.v.
July 1 3 a.m.			1,360	60	Very noisy. Sod. barb. 3 gr. i.m.
4 a.m.					Very restless. Morphine ¼ gr.
7 a.m.					,, ,, ,,
8 a.m.	++++	Trace	250		Quieter. Less dehydration. Normal respirations
11 a.m.				40	
3 p.m.					7th litre normal saline completed. Changed to 4% G.S.
4 p.m.	+	Trace	89		45 g. glucose added to drip fluid. Consciousness returning
8 p.m.					I.V. therapy discontinued. 5% G.S. run. P.R. for a few hours
10 p.m.	+++	Trace	222	20	
July 2 2 a.m.	Trace	+			
6 a.m.	Trace	+++			Glucose drinks started
10 a.m.			392	20	
2 p.m.	+++	0		20	20 g. carbohydrate 2-hourly by mouth from now onwards. Much better

B.=Benedict's test. R.=Rothera's test. G.S.=Glucose-saline.

The patient improved rapidly and was taking food at ordinary times on the third day after the onset of coma. Three weeks later she was discharged on a diet containing 180 g. of carbohydrate and a mixed dose of 16 units of P.Z.I. and 28 units of soluble insulin. She has had much the same dose ever since, and is quite well.

Past History.—It was only after recovery that the past history could be obtained. She had never been ill, and gave no family history of diabetes or any previous frank symptoms of diabetes, except perhaps an occasional "dryness" of the mouth at night. The relation of her very sudden coma to her slight air-raid trauma remains obscure.

I wish to thank Dr. R. D. Lawrence and Dr. W. G. Oakley for their help and encouragement in publishing this case.

Medical Memoranda

Unusual Cause of Death in Carcinoma of Cervix

As an appendix to Mr. Foster's records of two cases of adenocarcinoma of the small intestine (*Journal*, 1944, **2**, 78), I would like to describe a case of intestinal obstruction due to a secondary deposit of a squamous-celled cervical carcinoma.

Case History

Female, aged 52, married, 11 children; admitted to Lurgan District Hospital April 11, 1944. Her only previous illness was a "gall-stone" operation many years ago (details of this were not available). She complained of irregular and fairly smart vaginal bleeding for 6 weeks and attacks of epigastric pain, with vomiting and aggravated by food, for 6 months. Apart from some tenderness in the epigastrium, nothing abnormal was found on clinical examination. Vaginal examination revealed a hard area in the cervix. Biopsy of this enabled a diagnosis of cervical carcinoma, Stage I or early Stage II, to be made.

The patient was then transferred to the Royal Victoria Hospital, Belfast, with a view to radium therapy. There she underwent a Wertheim's hysterectomy, and was discharged on June 2 feeling very well. At operation the bladder was found to be adherent to the front of the uterus at the junction of the body and cervix. There were a few nodules on the posterior surface of the cervix; there was also an enlarged gland in the left parametrium. Histology revealed that the adhesions to the bladder were infiltrated with malignant cells. The diagnosis was thus squamous carcinoma of cervix, early Stage IV.

Two days after discharge from Belfast she was readmitted to a medical ward in Lurgan Hospital, complaining of colicky epigastric pain and vomiting. The possibility of biliary colic was considered, and she was kept under observation. She went out against advice on June 17, her condition being almost unchanged. Five days later she was readmitted to Lurgan Hospital still complaining of abdominal pain, with copious vomiting of brownish-green material. The diagnosis of small-gut obstruction was made, and after five pints of glucose-saline by intravenous drip had been given laparotomy was carried out. The ileum was greatly distended and many vascular adhesions were present in the pelvis. These were divided, but were considered insufficient to cause an obstruction. About an inch from the ileocaecal valve was a hard annular stricture which completely occluded the ileum; distal to this the gut was normal. An ileo-transversostomy was performed and the abdomen closed. Unfortunately the patient died in 6 hours (48 days after hysterectomy).

A very limited post-mortem examination was carried out and the growth removed. The peritoneal coat and mucous membrane appeared intact, but the lumen would admit a match-stick only with difficulty. The muscle coats were infiltrated with a whitish substance which apparently did not involve the peritoneum or the mucous membrane. Histology revealed this to be a squamous-celled carcinoma.

Discussion

Apart from the single gland in the left parametrium, no evidence of secondary deposits in the gut or elsewhere was found at hysterectomy: the ileocaecal region was not specially examined. It is possible that the long history of epigastric pain and vomiting was due to subacute intestinal obstruction which finally became acute, causing the terminal symptomatology.

The problem to be solved is the determination of the mode of spread. Was it due to implantation during hysterectomy—via the lymphatics of the retroperitoneal tissues or via the blood stream?

I am indebted to Mr. Bassett and Mr. Macafee for permission to publish details of this case.

J. STANLEY ELWOOD, M.B.,
Formerly R.M.O., Lurgan Hospital.

Reviews

GENETIC AND ENVIRONMENTAL FACTORS IN DISEASE

Psychosomatic Diagnosis. By Flanders Dunbar, M.D., Med.Sc.D., Ph.D. With foreword by Leonard G. Rowntree. (Pp. 741. 37s. 6d.) New York: Paul B. Hoeber, Inc.; London: Hamish Hamilton Medical Books.

Human Constitution in Clinical Medicine. By George Draper, M.D., C. W. Dupertuis, Ph.D., and J. L. Caughey jun., M.D., Med.Sc.D. (Pp. 273; illustrated. 21s.) New York: Paul B. Hoeber, Inc.; London: Hamish Hamilton Medical Books.

These two books are in a sense complementary. Dr. Flanders Dunbar lays stress on the environmental factor in disease, while Dr. Draper emphasizes the genetic one. Both, however, agree in their main conclusions. If Paracelsus and van Helmont were to return to earth they would doubtless be surprised to find, in a greatly changed medical world, a revived interest in their conception of the Archaeus, the "sensitive soul" housed in the solar plexus. Psychosomatic medicine is its modern equivalent: to-day we must discard the idea that any disease is wholly physical or wholly mental. This psychosomatic approach is only new in the sense that it attempts to substitute a scientific basis for things sensed intuitively by the older physicians. Dr. Flanders Dunbar in a detailed study of the subject recalls Sherrington's dictum that essentially the mind subserves an inhibitory function in relation to behaviour, and that the greatest relief of instinctual tension is provided by action, the least by fantasy and thought, whereas speech stands half-way between. In this connexion the degree and type of the patient's muscular tension, whether in postural attitude, voice, or gestures, particularly in their variations according to the matter under discussion, may be revealing if sometimes difficult to evaluate. Such tensions, as we know, can express themselves in visceral as well as in somatic muscles, thus producing organic symptoms. It is significant, in the present state of the world, that the use of the word "tension" has spread far beyond its scientific connotation into all forms of literature. Before psychosomatic medicine could pass from a merely intuitive to a scientific stage much, as the author points out, had to be accomplished in the basal sciences of anatomy, physiology, pathology, and clinical medicine; and it is only half a century since Freud with Breuer put forward their views on the psychic mechanism of hysterical phenomena, while the explanation of general paralysis as an organic disease distinct from other psychoses is still more recent. Small wonder then that we are still only on the margin of the subject, which will continue to revolutionize our conception of disease as we emerge from the too materialistic attitude of the recent past.

Dr. Dunbar's book is a painstaking, conscientious account of her twelve years of research along these lines. There are many interesting things in it, particularly her full discussion of the psychology of the "accident-prone." The interweaving of psychical traumata with the development of physical signs is clearly indicated. But we must confess that the book would have appealed more if not elaborated in quite so much detail, and if there was less use of the scientific jargon which defaces so much medical "literature."

This objection cannot be lodged against Dr. George Draper and his associates, Drs. Dupertuis and Caughey. The introduction to their book is attractively written; indeed sometimes they write so persuasively as almost to lull our critical sense into accepting the anthropometric standards at which Dr. Draper has worked so assiduously for many years. Yet we recall the late W. F. R. Weldon's biometric studies, which have proved less fruitful than their author hoped. An actuary can foretell with a considerable degree of accuracy the prospects of survival for two million persons of a certain age, but he cannot prophesy the fate of a single individual. In the same way physical measurements can give an average formula for those liable to develop peptic ulcer, gall-stones, pernicious anaemia, and so on, but individualism will assert itself in disease as in health. Indeed the authors appear to forestall this criticism when they say (p. 154): "Although results obtained by averaging the observations made on a large series of people have value, the striking of an average tends to submerge the individual quality of the diverse organisms that comprise the group." But, be it noted, they make this comment in the section on constitutional physiology, where they seem prepared to allow for more individual variation than in morphology. Indeed the sections on the physiological aspect and its clinical application to work are full of practical wisdom. Particularly we would commend the stress laid on the training of the student's power of direct observation—a power which is too often allowed to remain dormant. Insistence on attention to the patient as an individual and not a mere vehicle for a disease can never be made too strongly. The philosophic outlook of the chapter on "Growth, Development, Decline, and Death" should arouse the interest of even sluggish minds. Throughout we are given a very high ideal of the role of the physician, leading to the conclusion that "the fine technique of the initial approach to the person must be wrought from special qualities within the personality of the doctor and through his cultivated talents."

Theories, like words, have their vicissitudes. Fifty years ago the word "diathesis," despite its respectable ancestry, had fallen into disrepute under the impact of the laboratory. "Constitutional diseases" figured in the textbooks as a synonym for some diseases of unknown causation. But genetics and the study of inborn diseases soon showed the way to a more exact investigation of the constitutional factor, which was later reinforced by the psychological approach. Of the interest which has been evoked by the resulting impulse to treat the patient as an indivisible unit these two books are abundant evidence.

MASSAGE

Deep Massage and Manipulation Illustrated. By James Cyriax, M.D., B.Ch. (Pp. 242; illustrated. 15s.) London: Hamish Hamilton Medical Books. 1944.

This is essentially a book for the physiotherapist. The technique devised by the author is very fully described; the illustrations are excellent and demonstrate clearly his method and the conditions for which it may be used. A brief introduction is worthy of study by doctors who prescribe massage, for although the author states, "It is no part of the medical practitioner's duty to supervise the massage technique employed," there is no doubt that doctors ought to have some practical acquaintance with the scope and limitations of physiotherapy, and should, when prescribing massage, indicate clearly the object it is desired to attain. It is not unknown for massage to be prescribed for conditions for which it is unsuited or to the wrong parts, as, for instance, in sciatic pain originating in the gluteal muscles when massage is ordered for the sciatic nerve itself, where it can do no possible good. The author does not attempt to describe the technique of all forms of massage and limits himself in this book to deep friction, which if used intelligently in the way he advocates is likely to give gratifying results in cases which are often difficult to treat and may indeed lead to permanent disability. A point of some interest, departing from the common practice, is the author's view that heating should not precede deep massage but may follow it, and for this he gives sound reasons. Teachers of massage as well as students will find this book instructive and stimulating.

TUBERCULOSIS OF EAR, NOSE, AND THROAT

Tuberculosis of the Ear, Nose and Throat; including the Larynx, the Trachea, and Bronchi. By Mervin C. Myerson, M.D. (Pp. 291; illustrated. $5.50 prepaid or 30s.) Springfield and Baltimore: Charles C. Thomas; London: Baillière, Tindall and Cox. 1944.

Dr. Myerson writes on tuberculosis of the ear, nose, and throat from special experience gained at the Sea View Hospital, and his views therefore compel respect. A large part of the book is devoted to the larynx, and although this is satisfying it contains nothing original, and he adheres strictly to orthodox lines of treatment, relying much, as did Sir StClair Thomson, on the use of the cautery. Dr. Myerson's opinion upon the effect of pregnancy is expressed fully in a special chapter, and he takes a much less gloomy view of this combination than was formerly prevalent. No doubt many pregnancies have been terminated unnecessarily on this account, and the author's discussion gives valuable guidance on this difficult question. A notable section of the book deals with tuberculosis of the middle ear and mastoid process—an obscure and frequently overlooked lesion on which there is much illuminating information illustrated by good pathological material.

Lupus, apparently, is much less common in America than in Europe, and Dr. Myerson claims only a very small clinical experience of this form of tuberculosis. The most original part of the book is that in which tracheal and bronchial tuberculosis is described along with an account of bronchoscopy in this particular connexion. This is a recent application of the bronchoscope, and the views expressed upon its use and abuse are a valuable guide. Writing of the tongue it is stated that at the Sea View Hospital sections were made of 200 tongues, and 19.9% were affected with tuberculosis. This statement is repeated later in the book, so that it is apparently not merely a slip of the pen, but it is difficult to understand how the author arrived at this calculation. He has, however, produced a comprehensive and well-documented account of the subject based on a large personal experience, and those interested in tuberculosis will be grateful to him. There are numerous illustrations, most of which convey their meaning clearly enough but have little aesthetic merit, and their artistic level does not rise to the literary standard of the text.

Notes on Books

A third edition of *Aids to Materia Medica*, by Dr. GEORGE H. NEWNS, has been published by Baillière, Tindall and Cox at 5s. The author of this small book can be congratulated on having produced a very useful collection of information, which includes the essential points of the actions of most of the substances considered. For the student wishing to prepare for an oral examination it should be valuable.

The appearance of a fifth edition of Dr. WILLIAM BROWN'S *Psychology and Psychotherapy* 24 years after the first bespeaks its continued popularity. Dr. Brown is dogmatic and persuasive, and in his writing does not employ too many technicalities. He follows no particular school and has theories of his own. He has enjoyed a deserved reputation as a successful psychotherapist and so is well equipped to appeal to the public in his writings. The first part of the book deals with the theories of psycho-analysis in relation to his own and relates some of his experiences in treatment. There is a new chapter on alcoholism which does not present anything specially new. The other new chapter is on the psychology of modern Germany, in which he traces the philosophical background of Nazi doctrine, then traces Hitler's own psychological development, classing him as both a paranoid and a hysteric. He considers that the German people as a result of their reactions to their defeat in the last war have identified themselves with Hitler's mentality and are also paranoid and hysteric. The chapters on the relation of mind to brain and on psychical research are little altered. Dr. Brown favours Bergson's philosophy and retains an open mind on but continued interest in spiritualism. The book is published by Edward Arnold at 14s.

Lieut.-Col. B. W. RYCROFT'S unambitious little book, *A Manual of Ophthalmology for Medical Officers* (Hamish Hamilton Medical Books; 10s. 6d.), should prove of considerable value to medical officers in the Services. The author devotes the introductory third of his text to methods of examination, to a description of standard lesions, and to an excellent general summary of the various methods of treatment employed. This makes the rest of the book easy to understand and apply. A final chapter deals with the special eye problems seen on active service. The many tables and summary classifications should be an extra help.

The Surrey Benevolent Medical Society was founded in May, 1812, by a meeting of doctors held at Epsom. It was at first of a social nature with a scientific side, exemplified by papers and discussions on medical subjects. As money accumulated the charitable side grew, and to-day the benevolent fund stands at over £24,000 in addition to the possession of four perpetual scholarships at Epsom College, bought in 1855. Dr. A. R. Walters of Reigate, one of the vice-presidents, has prepared a pamphlet which begins with a history of the founder, Thomas Martin, and follows with extracts from the minute-book giving a view of development and progress. The society helps doctors who are in need with the education of their children and the support of their families. Though the financial position is now very strong more members are needed. The hon. secretary is Dr. L. J. Barford, Heather Lodge, Redhill.

Dr. J. WILSON REID, honorary medical officer of H.M.S. *Conway*, has compiled a pamphlet, *Emergency Treatment of the Injured and Sick at Sea*, to meet primarily the needs of cadets training for sea service. It includes notes on further treatment when medical aid is unobtainable, for guidance in exceptional circumstances where there is no hope of the casualty receiving medical attention for some considerable time. These notes are printed in italics and clearly marked so that such guidance may not be misused. The pamphlet is published at 2s by Charles Birchall and Sons, Ltd., Liverpool and London.

Preparations and Appliances

USE OF SYNTHETIC MATERIALS FOR SURGICAL DRAINAGE

Mr. STEWART MANN, M.B., F.R.C.S.ED., assistant surgeon to out-patients, Glasgow Royal Infirmary, writes:

Improvement in surgical technique now makes the necessity for drainage less than in former times; and the dangers attending the indiscriminate insertion of foreign bodies into wounds for this purpose have been emphasized by Kanavel, Trueta, Watson-Jones, and other writers; but there are still many indications for their employment, and great quantities of natural rubber are consumed. This material, the conservation of which has been repeatedly stressed by the Combined Raw Materials Board, has not been surpassed by any other since it was introduced by Chassaignac in 1859. In virtue of its resilience, flexibility, and capacity to transport blood and inflammatory products, it has gradually superseded the catgut strands of Cheine, the soft lead tubes of Bell, and the resorbent tubes of Neubauer, which were responsible for MacEwen's development of the decalcified chicken-bone drain.

A satisfactory drainage tube must be flexible without kinking too easily. It requires to be light in weight, non-adhesive, non-toxic, easily sterilized and cut, and not too easily compressed by heavy flaps or sutured wound edges. It is a desirable feature that the end in contact with the tissues of the body should be soft enough to minimize trauma or necrosis. Excepting rubber, there are few materials capable of fulfilling all these requirements; but we believe that there are possibilities in the field of synthetic plastics, and the two types described below have been used by us extensively during the past two years.

Resinized Cotton Tubes.—These are constructed of finely woven cotton impregnated with a resin which does not crack or flake. When the tube is bent, the interstices of the woven fabric are compressed on one side and opened out on the other—a design which confers a limited flexibility. These tubes, well known in the electrical industry, are marketed under various names and can be sterilized by boiling. Samples that had been autoclaved in the usual way gave no growth of bacteria after five days' incubation in anaerobic fluid media. They are prepared for use by immersing one end for five minutes in a 1 in 20 solution of carbolic acid to dissolve the resin from the walls so as to allow the part in contact with the tissues to exert the capillarity conferred by its texture and to stimulate local reversal of the lymph circulation in the sense described by Horsley and Whitehead. This procedure is essential to soften the end to be inserted. The tubes can then be boiled, cut, shortened, and adapted, and may be stitched in position. Though these tubes are cheaper than corresponding rubber ones, they are not nearly so flexible and, being easily kinked, are unsuitable for abdominal surgery. In spite of these limitations, they have been used with advantage in the out-patient department of our unit for nearly two years.

P.V.C. (Polyvinyl Chloride) tubes are composed of a plastic manufactured by heat extrusion. They have physical properties which render them almost indistinguishable from tubes of natural rubber. The P.V.C. tube is unaffected by age, water, salt solutions, bile, pus, or body fluids, inorganic acids and alkalis, or mineral oils. They can be manufactured in all colours and in various grades of thickness and flexibility, according to specification. They have been used with success in all cases where rubber drainage tubes were formerly used, including drainage of the pelvis, gall-bladder, and peritoneal and pleural sacs. It should be noted that immediately after sterilization by heat they may become too soft for general use, but will regain their original texture after immersion for a few minutes in cold saline solution.

Though recommended as a wartime emergency measure, it is believed that more lasting advantages may result from the adoption of tubes prepared from synthetic materials for purposes of surgical drainage. I wish to express gratitude to Mr. George Swanson, visiting surgeon, Glasgow Royal Infirmary, who supervised their use in his unit, for helpful suggestions and advice; and to the Duratube Co., Middlesex, for supplies of material.

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GENERIC AND SPECIFIC TRIVIAL NAMES OF THE MALIGNANT TERTIAN AND QUARTAN MALARIA PARASITES

BY

FRANCIS HEMMING, C.M.G., C.B.E.

Secretary to the International Commission on Zoological Nomenclature

The *Official List of Generic Names in Zoology* was established by the International Congress of Zoology in order to promote stability in zoological nomenclature by placing on record the correct names of the principal genera in each of the classes and orders of the animal kingdom, together with their type species. Hitherto names have been placed on the *Official List* in *Opinions* rendered by the International Commission on Zoological Nomenclature, but in 1943 the International Commission decided that it was desirable to make the *Official List* more readily available, and accordingly determined to publish it as soon as possible in convenient book form and with a full index. The preparation of the *Official List* for publication in this way, which was begun in the autumn of 1943, involved the checking of all the relevant bibliographical and other references to the generic names concerned and their type species. In the course of this work, errors were detected in a number of the *Opinions* containing decisions relating to the *Official List*. These errors are being brought at once to the attention of the International Commission with a view to their rendering an *Opinion* as soon as possible containing such rectifications as may be necessary.

Among the errors detected were errors in the entries in *Opinion 104* (published in 1928) relating to the author's name and date of publication of the generic name for the malignant tertian malaria parasite (*Laverania* Feletti and Grassi, 1889). Further, in the case both of this name and of that for the quartan parasite (*Plasmodium* Marchiafava and Celli, 1885) the type species was found to have been cited under a name which was not the correct name under the International Code of Zoological Nomenclature. The names of these parasites, as recorded in *Opinion 104*, are the names now universally employed for these species in the enormous medical and technical literature relating to malaria, and it would clearly be as wrong as it would be impracticable to attempt to introduce changes in such names merely on grounds of zoological nomenclature. In the present case such changes would be particularly undesirable, since they would involve the transfer of the specific trivial name "*malariae*" from the quartan parasite (on which it was bestowed by Grassi and Feletti, 1890), by which name this species is universally known, to the malignant tertian parasite, on which in 1881 it had been independently bestowed by Laveran (and by which name this species is never called). Transfer of trivial names in this way causes great confusion, and the only solution in such a case is for the International Commission to use its plenary powers to suspend the rules in order to validate the names currently in use. It was accordingly decided early in 1944 to invite the International Commission to deal with this question under its plenary powers, and for this purpose a thorough investigation into the highly complicated literature of these names was made, with the assistance of Sir Rickard Christophers and Brig. J. Sinton, whose paper "The Correct Name of the Malignant Tertian Malaria Parasite," published in the *British Medical Journal* (1938, **2**, 1130), must form the starting-point of any work on this subject. In the course of this investigation names previously overlooked were brought to light and other unsuspected nomenclatorial difficulties were disclosed. A paper setting out in detail the present position under the International Code and containing recommendations to the Commission for placing the whole matter on a satisfactory footing has been prepared and will appear in the next Part of the *Bulletin of Zoological Nomenclature*, the official organ of the International Commission on Zoological Nomenclature.

Quite recently the Officer in Charge of Malaria Control in War Areas, Atlanta, Georgia, U.S.A., communicated to the International Commission an application prepared by Drs. Curtis W. Sabrosky and Robert L. Usinger, U.S. Public Health Service, drawing attention to the errors in *Opinion 104*, and requesting the International Commission to use its plenary powers to suspend the rules for the purpose of validating existing nomenclatorial practice in regard to these parasites. This application has since been published in the issue of *Science* of Sept. 1, 1944. It is extremely gratifying to the Executive Committee of the International Commission to find that malariologists in the United States, working independently, have reached substantially identical conclusions in regard to this matter, since this should greatly facilitate the early adoption by the International Commission of an *Opinion* setting this matter at rest once and for all.

In order to secure the widest support for the action proposed to be taken, the Executive Committee, on behalf of the International Commission, invites expressions of opinion from specialists concerned in any aspect of the malaria problem. Such communications, which should be addressed to the International Commission on Zoological Nomenclature at its Publications Office, at 41, Queen's Gate, London, S.W.7, will at once be published in the Commission's official organ, the *Bulletin of Zoological Nomenclature*, in order that the whole of the material relating to this case may be before the Commissioners when reaching their decision.

ANGLO-AMERICAN CONSULTANTS CONFERENCE

A conference unique in the annals of medical meetings took place in Brussels on Dec. 10 and 11 under arrangements made by the Director of Medical Services, 21st Army Group, with the assistance on the professional side of Brig. A. E. Porritt, Consulting Surgeon, Brig. E. Bulmer, Consulting Physician, and Col. J. S. K. Boyd, Deputy Director of Pathology. Over 50 consultants—American, British, and Canadian—from the Forces in N.W. Europe attended, with representatives of the War Office and of Canadian Medical Headquarters. This followed a similar meeting in Paris in October, 1944, organized by Major-Gen. P. R. Hawley, Chief Surgeon, European Theatre of Operations, U.S. Army, which proved so valuable that further meetings were thought necessary in order to integrate the professional work of the several Armies.

The proceedings in Brussels comprised a combined meeting of physicians and surgeons, followed by meetings of medical and surgical sections. The subjects discussed were: Chest wounds (Major J. L. Collis, R.A.M.C.), uses of penicillin (Lieut.-Col. G. A. G. Mitchell, R.A.M.C.), personal re-allocation (Lieut.-Col. W. R. Lewin, R.T.R.), dermatology (Lieut.-Col. F. F. Hellier, R.A.M.C.), Weil's disease (Brig. E. Bulmer, R.A.M.C.), diphtheria (Major-Gen. A. G. Biggam), prevalent diseases (Col. W. S. Middleton, U.S.A.M.C.), paraplegics (Brig. G. Riddoch, R.A.M.C.), abdominal wounds (Col. Elliott Cutler, U.S.A.M.C.), anaesthetics (Lieut.-Col. R. M. Tovell, U.S.A.M.C.), vascular injuries (Lieut.-Col. C. B. Odom, U.S.A.M.C.), head injuries (Brig. H. W. B. Cairns, R.A.M.C.), burns (Lieut.-Col. E. M. Bricker, U.S.A.M.C.), joint injuries (Lieut.-Col. A. L. Eyre-Brook, R.A.M.C.)

Throughout the conference there was a remarkable absence of diversity of opinion, though there was a very free interchange of views and experiences. Many of the problems of war medicine and surgery have such important implications that they cannot be ventilated publicly, while their successful solution is, at times, more valuable to the Allies than the enemy's "secret weapons" are harmful. Such an opportunity for pooling knowledge as this conference afforded is of inestimable value to the war effort, and achieves not only this immediate purpose but helps to pave the way to the establishment of that international understanding and unity of purpose which must in due course be the keystones of a successful peace.

A small committee has been set up in Edinburgh to organize a memorial to Dr. Andrew Graham Ritchie, F.R.C.P.Ed., who died on Oct. 12, 1944. It is proposed to provide a bursary to be awarded annually to a medical graduate of Edinburgh University. The award will be based on character rather than on educational attainments, and preference will be given to the son or daughter of a member of the medical profession.

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THE WATCH ON LONDON'S WATER

One of the outstanding public health achievements of the war has been the protection of London's water supply. Seven years ago, owing to the accidental contamination of one of its wells, Croydon had an outbreak of typhoid, with 323 cases and 43 deaths, and public alarm and indignation were widespread. But if, through the hazards of war, only one of the twelve filtration works of the Metropolitan Water Board had become a source of infection, the result, calculated on the basis of previous epidemics, would have been an outbreak fifty times greater than that of Croydon, not to speak of hundreds of permanent carriers to form a reservoir of fresh infection. The calamity not only to public health but to public morale can be imagined. In fact not a single case of typhoid attributable to the water supply has occurred in London since September, 1939. The water supply of the immense metropolitan area must have seemed as obvious and desirable a target for the enemy as the wells of Moab to the predatory children of Israel. To stop or to pollute the water supply of one-sixth of the people of this country would have been a paralysing blow in total war, worth many military victories. The metropolitan water system covers an area four times the size of the Isle of Wight and serves seven million people, to whom it brings a daily average of 300 million gallons. To distribute this water through 8,000 miles of pipes is far more than a gigantic piece of plumbing. Five-sixths of the supply is river water, which becomes more and more heavily polluted and has to undergo most elaborate purification; while the remaining one-sixth, from the wells of the great chalk basin beneath London, is progressively deteriorating with increased urbanization, and must be chlorinated. Continual examination and analysis is necessary.

To use a phrase which has quickly become hackneyed, "it can now be revealed" what precautions the Metropolitan Water Board took during the years of war. A part of the revelation was made in a recent lecture at the Royal Institution by Lieut.-Col. E. F. W. Mackenzie, director of water examination, who now fills the office which Sir Alexander Houston occupied with far more than local renown for thirty years. Every conceivable form of damage was done by aerial attack, though apparently most of it was incidental. Sewers were damaged during every raid, with the result that untreated sewage was discharged into the river from which the raw water supplies came. Reservoirs were cut off from purification works by the destruction of aqueducts. Bombs fell into filter beds and caused short circuits between filtered and unfiltered water channels. The demand for water against fire necessitated the occasional by-passing of the slow sand filters in order that supplies might be maintained. Fracture of water mains was an almost inevitable accompaniment of heavy aerial bombardment; on one night alone five hundred mains were broken. Yet, though the opportunities for dangerous pollution were manifold, London escaped any epidemic. During four years of war bacteriological analyses were carried out on more than 50,000 samples drawn at the works, particularly in localities where bomb damage had been heavy, and 99.3% showed absence of *B. coli* in 100 ml.—in other words, the water conformed to the highest standard of bacterial purity.

How this achievement was brought about is in many ways technical and to be appreciated only by the water engineer. In the first place it was determined that there should be no interruption in the routine of laboratory examination and quality control. Suitable buildings in comparatively safe areas were converted into accessory or alternative laboratories. Pre-chlorination, in high dosage when necessary, was extended to all the filter works, thereby making it certain that the water was in a state of considerable bacterial purity before it even reached the filters. The residual chlorine in the water passed into supply was increased to the highest level consistent with avoidance of serious complaint on the ground of taste. By this means the danger of bacterial pollution through seepage of ground water into broken filtered water channels was, if not neutralized, at least greatly reduced. But the presence of this residual chlorine in the water was not made an excuse for relaxing the more positive methods of protection. Chlorination is ordinarily regarded as only the third in importance of the purification processes, the first two being storage in large reservoirs and filtration through slow sand filters, though it was foreseen that at any moment the circumstances of war might make chlorination the most important, or even the only, barrier against the spread of water-borne disease. Chlorine installations were duplicated at convenient points; provision was made for applying chlorination where no apparatus had existed, and mobile chlorinators were also brought into use and assigned to different areas in London.

The possibility of chemical poisons being introduced into the water, either deliberately or accidentally by the use of poison-gas bombs, was countered by a system of guards at the works and reservoirs and by arrangements for immediate testing on suspicion of contamination. A staff of sample collectors and analysts was employed at the central laboratories day and night to carry out confirmatory tests. The ever-present danger of the admission of the contents of sewage channels into water channels owing to the fracture of both was provided against by the use of valves which permitted of rapid closure in emergency and by a thorough flushing and disinfection of any main after repair and before it was brought back into supply. To add to all this it must be remembered that it was not only for purity but for plenty that the Metropolitan Water Board had to strive. In heavy raids local destruction caused occasional interruption of water supplies, and one of the most heartrending things was to see fire spreading from house to house, as we saw it in one cherished district of old London, with the firemen standing helplessly by because the water supply was exhausted. It must have

been a heavy responsibility to decide how far orthodox methods of purification might be discarded with a view to increased production. It was constantly a choice between two very different but heavy risks—and there is no hard-and-fast line between a safe and an unsafe water, any more than between a state of health and of disease.

Those in charge of London water have written a great new chapter in public health history during the last five years, but like so many chapters of the kind, because the beaten adversary was largely unseen, because the possible calamity never took shape, it goes largely unread. The citizen will still go to his tap and turn on the water of the Thames or the Lea, and expect to find it pure and tasteless for drinking and plentiful and clear for cleanliness, and will have something to say about it if it is not. The achievement will be written off as just another piece of constabulary duty—the sort of thing one has a right to expect of a British public service; and that, indeed, is the highest compliment that can be paid to it.

THE MEDICAL FILM

The Scientific Film Association is to be congratulated on having made a start with the organization and co-ordination of medical cinematography. The purpose of the medical film is quite different from that of the entertainment film, and it is important that they should not be confused. Otherwise comparisons are inevitably drawn which are inappropriate, because the two types of film should be used in an entirely different way; nothing is more tedious than an unbroken succession of medical or scientific films. We therefore strongly recommend the Scientific Film Association at once to give up any idea of medical film shows and not to repeat the type of programme presented at the meeting held at the Royal Society of Medicine on Dec. 7. This programme contained four films. The first dealt with the removal of a shell fragment from the heart; it was of no scientific value, and its proper place was in a news reel or magazine programme at a public cinema. The second dealt with the genesis of function in the embryo; it was highly technical, dealing with actual research, and was incomprehensible without a detailed verbal introduction. The third was a straightforward teaching film on spinal anaesthetics. The fourth dealt with the survival and revival of organs and organisms; it had far-reaching implications for surgery and philosophy and would have served as the introduction to an enthralling debate. All this was packed into 90 minutes. It would not be unfair to say that the programme had attracted the wrong kind of audience—an audience interested in means rather than ends. It left an effect of acute fatigue and confusion. Such a programme may have been thought necessary as providing an initial fillip to the study of the scientific film. In itself, however, it contributed nothing to the understanding of the place of the film in medical teaching, and it may, in fact, have confirmed some people in the opinion that the scientific film is an extra-curricular activity, to be classed with party politics and amateur theatricals, all of which merely lure the student from the straight and narrow way.

The film may be used in medicine for public propaganda, for undergraduate and postgraduate teaching, or for the presentation of the results of research. We shall forgo discussion of medical propaganda films except to say that we believe that, like medical broadcasting, they are of tremendous importance in the education of democracy, and the best brains in medicine should be prepared to collaborate in their production. In the narrower field concerned with the showing of films within the profession, what is needed is actual demonstration of how to use the film in teaching and how to use the film to present the results of research. How helpful are the scabies films in the teaching of dermatology or the malaria film in the teaching of malariology? Should the two scabies films be given in immediate succession to drive the lessons home? How does Prof. X actually use his series of films of tics and tremors in student teaching? To what extent can we use the film as the gramophone is used for teaching musical appreciation, stopping and repeating until the lesson has been learned? Why was Florey's penicillin film such a brilliant illustration to his address, and was its effect produced by intellectual or emotional means? Can we formulate any general rules for the use of colour and the animated cartoon? The best way to begin attacking these problems may be to create a Section of Medical Cinematography in the Royal Society of Medicine. Such a section would hold two kinds of meetings. There would be combined meetings where methods of teaching would be demonstrated or original work would be illustrated by films. Thus the anaesthetic films would be shown at the Section of Anaesthetics, and discussions would be held to estimate their precise value in the teaching of anaesthetics. The Section of Medical Cinematography would also have its own meetings, at which films were shown and criticized from the aspect of production and technique. Whichever kind of meeting was held, it would rarely be desirable to show more than one film on any single occasion.

As a profession, then, it is high time we got past the penny-gaff state of mind, gave up going to meetings merely to see medical films, and began to wrestle seriously with the problem of the value and methods of illustrating the medical lecture by the new techniques of the cinema film and the sound track. As is pointed out in a recent broadsheet on British documentary films,[1] there is more experience and skill available in this country for the production of scientific and factual films than in any country in the world. Hitherto it has hardly been employed at all in the service of education, and we have the vicious circle that there are no films because the schools do not have the projection apparatus to show them, and vice versa. In an instructive article on medical films[2] Longland, MacKeith, and Stanford have pointed out that the Goodenough Committee gave no consideration to the use of the film in medical schools or to the cost of such a development. It is to be hoped that the medical schools will repair this omission in their discussion of the Report. If the clinical period is to be kept at 2½ years they will have to copy the Services and devise some form of synthetic training in which clinical experience is sup-

[1] *Planning*, 1944, No. 228, Dec. 8.
[2] *Lancet*, 1944, **2**, 585.

plemented by cinematic instruction. What is needed now is not so much technical advances in the production of films as hard thinking and experiment to determine how best to integrate the film with the rest of the apparatus of medical education. Unfortunately the older teachers seem more concerned with the politics of the Goodenough report—the fate of the colleges, the role of the municipal hospitals, and the placement of women students—than with improving the technique of education; and we may have to wait for the younger generation to return from the wars before we can get radical changes in medical teaching.

TERMINOLOGY IN MALARIA

For some time terminology in malaria, especially that relating to the epidemiology of this disease, has been in need of revision and standardization to bring it into line with modern conceptions and usage, and, so far as possible, to attain uniformity and precision in the meaning of terms employed by workers of different countries. The Health Section of the League of Nations shortly before the war appointed a committee to consider the standardization of terminology in malaria, and its report has been published. Further, in this number of the *Journal*, Mr. Francis Hemming, Secretary to the International Commission on Zoological Nomenclature, contributes an article on the generic and specific names of the malignant tertian and quartan malaria parasites. These documents provide a clear and useful review of the subject. The report of the Health Section of the League of Nations consists of two parts—a commentary and a glossary of precise definitions. The commentary outlines the chief facts of malaria and its epidemiology, indicates the terms in use, and explains why some of them should be retained or improved upon. A suggestion welcome to the practical worker is that the expressions *vivax* malaria or infection, *falciparum* malaria or infection, etc., should be employed in place of such clumsy and archaic names as "simple tertian," "benign tertian," and the like. The full explanation of what is meant and implied by various indices in use, the treatment of the problems connected with endemicity, and the guidance to the nomenclature of species and varieties of anopheles, should all help to achieve precision and uniformity.

The correct names of the malaria parasites have long been a matter of controversy, and it is here that the communication from the Secretary to the Commission on Zoological Nomenclature promises a satisfactory solution. The names *praecox*, *immaculatum*, *tropica*, and *falciparum* claimed by their respective upholders as carrying priority are none of them seemingly the correct name of the malignant tertian parasite judged by strictly zoological standards. Yet by a sort of irony of error it is impossible now to apply the correct name either to the malignant tertian or to the quartan parasite, because the correct specific name for the malignant tertian parasite cannot be anything else but *malariae*—the name given to it by Laveran, who first described this parasite; the very name that for nearly half a century by reason of an early error has, through a vast literature, been incorrectly used to designate the quartan parasite. It is unthinkable that a change could now be made, and fortunately in such cases the International Commission on Zoological Nomenclature has power to rectify matters by suspending the rules, if necessary, to validate names currently in use. That it is proposed, as will be seen from the Secretary's communication, to exercise these powers will be generally welcomed.

HOUSING THE ROYAL COLLEGES

An article on another page briefly tells the story, so far as it has gone up to now, of the project to bring together on a common site in the middle of London the Royal College of Physicians, the Royal College of Surgeons, and the Royal College of Obstetricians and Gynaecologists. Letters printed in the *Times* last week have put the idea into the foreground. This is a matter of great interest and importance to medicine, and it should have free discussion. The attitude of the R.C.S. is clear and has been openly stated in the annual report. At the annual meeting of Fellows and Members on Nov. 16 the President said, with regard to the rebuilding of the College and the proposal to build the other Royal Colleges on adjacent sites, that the possibilities of building elsewhere had been explored, but the manifest advantages of the site in Lincoln's Inn Fields seemed to outweigh them. Nevertheless the Council of the R.C.S. has said it is prepared to make big sacrifices if convinced that a move is necessary for the promotion of better relations or facilities between the three corporations. It may be supposed that the R.C.O.G. would welcome removal from its house in Queen Anne Street to the large site on the south side of Lincoln's Inn Fields. More than fifteen years ago the R.C.P. decided that its building in Pall Mall East and Trafalgar Square, which opened in 1825 when the College moved from Warwick Lane in the City of London, was unsuited for its purpose and that a new home should be sought. By 1934 negotiations for the sale of the Trafalgar Square site to the Canadian Government for the enlargement of Canada House were nearly complete, but had to be broken off. In recent years the Standing Joint Committee of the three Colleges came to the unanimous conclusion that the securing of a single site was more important than the qualities of any particular site. Meanwhile the R.C.S. has acquired new ground in Lincoln's Inn Fields large enough to accommodate the needs of all three Colleges as well as a number of the major specialties. A factor which must carry weight with the Fellows of the R.C.P., on whom rests the responsibility of decision, is that, in Lord Dawson's words, "the present Canadian Government is still wishful, subject to negotiation, to purchase the R.C.P. building." The scheme for adjacent College buildings in Lincoln's Inn Fields may be both practicable and desirable from the point of view of the R.C.P.: it certainly deserves early and careful consideration. There would seem to be much to gain and little to lose if consultants and specialists were topographically conjoined in Lincoln's Inn Fields.

PREVENTION OF BLINDNESS

An intensive sight-saving campaign promoted by the National Institute for the Blind is opening in 1945. Already the rehabilitation work of the Institute has brought the light of a fuller life to those who labour in physical darkness. Recently the County Councils Association and the Association of Municipal Associations requested the Institute to prepare a minimum scheme of ophthalmological research, which has been adopted, and presently it is expected that the major local authorities will be invited to support it. Meanwhile, Oxford University Medical School resolved upon establishing a research centre with Miss Ida Mann at its head. That department has already done promising work. A fund was opened a year ago, and £100,000 has been received from voluntary sources, mainly industrial. Sir James Marchant, who has been promoting the Oxford Fund, has now been invited by the Prevention of Blindness Committee of the N.I.B. to undertake the founding of a central fund from

which the centres in London, Leeds, and Manchester will largely profit. The results of these research centres will be co-ordinated, and it is confidently expected that in a generation blindness will be much reduced. Writing on this campaign for 1945 Sir James reminds us that ophthalmology as a university subject involves the co-ordinated study of the dominant sense in man in all its aspects—evolutionary, developmental, physiological, psychological, and pathological. The demand for research in industry and medicine is not merely a matter for technical experts: it is a new venture in human thought. He asks that his appeal should not be regarded as a mere matter of charity; it is a business proposition which will pay a handsome dividend. The present aim is to raise £1,000,000. He is to be found at 224, Great Portland Street, London, W.1, or Lenthay Lodge, Sherborne, Dorset.

SCIENTIFIC CO-OPERATION WITH CHINA

Anyone who thinks about China must reflect that famine and disease, both before and during the Sino-Japanese War, have taken a far greater toll of the lives of Chinese babies than have Japanese bombs. It is remarkable that China, after a war of such duration and under such conditions, has continued to manifest even a show of resistance. If sympathy for China is to have value it must be based on a correct interpretation of China's needs. The material aid that can be given to China will continue to be limited by the general war situation, and such is the state of communications that Chinese scientific workers have been cut off from scientific and technical journals and have therefore been unable to follow the progress of science in the West. Some of the barriers to a flow of information on scientific matters between this country and China have recently been discussed in *Nature* and in an article by Dr. Joseph Needham, F.R.S., in the same journal.[1 2]

Dr. Needham is director of the British Council Cultural Scientific Office in Chungking. The story of the development of this office is told in the Report of the British Council for 1943–4.[3] Dr. Needham arrived in February, 1943, and immediately embarked upon an exacting programme of visits, discussion, and lectures which involved extensive travel under difficult conditions and no little physical hardship. By February, 1944, he had visited over 100 Chinese scientific institutions. Within a few weeks of his arrival he had submitted to the British Ambassador a detailed memorandum which led to the formation of the British Council scientific office which he now directs. Dr. Needham was later joined by Dr. Dorothy Needham, also a distinguished biochemist, and the services of Prof. William Band, a physicist, were loaned by Yenching University, Peiping. More recently Dr. L. E. R. Picken, a Cambridge zoologist, joined the staff in Chungking. Both Dr. J. Needham and Dr. Picken have, in addition to their scientific attainments, been students of the Chinese language and culture for some years.

A few weeks ago Dr. A. G. Sanders, of the Sir William Dunn School of Pathology, Oxford, one of Sir Howard Florey's team of workers on penicillin, arrived in Chungking as medical adviser to the British Council office for a period of not less than one year. Dr. Sanders has had experience both as a clinician and as a laboratory worker, and although he will be concerned with the supply of information on a wide range of medical subjects, his ability to speak as an expert on penicillin—and, particularly, on its non-industrial production with improvised equipment—may have practical significance.

It is satisfactory to note that the *British Medical Journal* is one of many scientific periodicals which the British Council is now sending regularly by air-mail on microfilm. Copies of the journals themselves are necessarily sent by a slower and more uncertain route. Since the establishment of the scientific office in Chungking it has been possible also to meet many requests for books and reprints. It is to be hoped that these efforts will be accepted in China as an expression of the desire of British medical and other scientific workers to offer the fullest collaboration to their Chinese colleagues and to help them to endure for yet a little while that unhappy isolation which circumstances have thrust upon them.

PHARMACOPOEIAL POLICY

The Seventh Addendum to the *British Pharmacopoeia, 1932*, shows a continuation of the progressive policy of the Pharmacopoeia Commission. Among the additions are benzedrine under the pharmacopoeial name of amphetamine, cyclopropane, zinc-protamine-insulin, nembutal under the name of soluble pentobarbitone, and all the sulphonamides with the exception of sulphasuxidine and sulphamezathine. It is interesting that gratus strophanthin (or ouabain) has been included. This is a crystalline strophanthin of constant activity, and it remains to be seen whether doctors will use it more than they have the *kombé* strophanthin, which is already included. The potency of the *kombé* strophanthin was ensured by a biological standardization. Since the introduction of digoxin the profession appears to have neglected the use of strophanthin for injection, though it has considerable value as a heart tonic.

The Addendum contains a large number of monographs for various tablets. Codeine phosphate appears in the *B.P.* not merely as codeine phosphate but also as tabellae codeinae phosphatis, so that each tablet contains not less than 87.5% or more than 110.5% of the prescribed or stated amount: the manufacturer, in making a large batch of tablets by mixture with an excipient, will have to take care that the distribution of the codeine is reasonably uniform in the mixture. Tablets are now official for several barbiturates, sulphonamides, antipyretics, vitamin preparations, and other substances. Provision is made for those doctors who do not state what dose the tablet is to contain, by a statement of what is to be dispensed. "Soluble thiopentone" is another addition of interest, though few will recognize pentothal under this description: the Addendum does not indicate that soluble thiopentone and pentothal are one and the same thing. The *Pharmacopoeia* would help its readers if it published proprietary names as synonyms or else as the names of substances having a very similar action. A large New York hospital recently instructed its dispensary to supply, for all proprietary articles ordered for patients, the equivalent products described in the *United States Pharmacopoeia*; this saved the hospital no less than £12,500 in one year—which shows there is something in a name after all. Dispensers in British hospitals might take a hint, and teachers of clinical medicine might set their housemen an example by eschewing the use of proprietary names when official terms exist: it should be quite simple to call sulphanilamide by its name instead of by one of the numerous fancy terms politely called synonyms.

Prof. G. Grey Turner will deliver the Hunterian Oration before the Royal College of Surgeons of England on Wednesday, Feb. 14. His subject is "The Hunterian Museum: Yesterday and To-morrow."

[1] *Nature*, 1944, **154**, 649.
[2] Ibid., p. 657.
[3] *Report of the British Council 1943–1944*, 1944, 3, Hanover Street, London.

SUPERVISION OF MENTAL DEFECTIVES IN THE COMMUNITY

BY

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The object of this communication is to place on record the changes which wartime has brought to those mental defectives who live in the community. This study is limited to those persons ascertained as mental defectives under the Mental Deficiency Acts (1913 and 1927) and therefore under the supervision of the local authority. This supervision was undertaken primarily to provide an immediate remedy where the defective was being cruelly treated or had been left without adequate protection, and also afforded an opportunity to give warning and assistance to the relatives where such were found necessary. The name of the ascertained mental defective is recorded in the National Register as a person not subject to the National Services (Armed Forces) Act, 1939; he is thus able to seek employment on his own without reference to the employment exchange. As a result of shortage of man-power some of those who before the war would have been looked upon as unemployable are now in full work.

To my knowledge no similar investigation has been recorded in the English literature, but Kannar (1942) has drawn attention to the comparable position in the United States of America.

Statutory Supervision

At the beginning of 1944 there were 323 ascertained mental defectives in Gloucestershire subject to supervision by health visitors. This total may be divided for the sake of convenience into three main groups, and it is the third group with which these notes are mainly concerned.

(*a*) *Unsuitable for School (96 Cases).*—These are the youngest cases under statutory supervision, and include children below school age and children of school age who are uneducable either at an ordinary elementary school or at a special school for mental defectives. By reason of mental defect their names were removed from the school registers.

TABLE I.—*Male Mental Defectives under Statutory Supervision*

No.	Age	Mental Age	Source of Ascertainment	Employment
1	29	—	School	Forestry
2	19	8 years	,,	Factory worker
3	18	9 years 7 months	,,	Collier
4	25	8 years	,,	Agricultural worker
5	22	6 years	,,	Coal haulier
6	24	7 years 6 months	,,	Agricultural worker
7	29	7 years	,,	Builder's labourer
8	19	6 years	,,	Factory worker
9	16	7 years 10 months	,,	Agricultural worker
10	32	—	,,	Works at saw mills
11	15	5 years 6 months	,,	Thatcher
12	18	11 years 6 months	,,	Agricultural worker
13	34	5 years 9 months	,,	,, ,,
14	33	8 years	,,	General help at hotel
15	24	9 years 4 months	,,	Lorry driver's mate
16	28	—	M.O.H.	,, ,, ,,
17	22	5 years 2 months	School	Errand boy
18	18	9 years	,,	Agricultural worker
19	17	9 years	,,	Collier
20	19	7 years 3 months	,,	Checker, rlwy. goods dept.
21	22	7 years 6 months	,,	Boot factory
22	30	—	,,	Agricultural worker
23	17	9 years 9 months	,,	,, ,,
24	25	8 years 7 months	,,	Machinist at factory
25	21	—	,,	Agricultural worker
26	22	7 years 6 months	,,	,, ,,
27	39	—	,,	Office cleaner
28	25	7 years 3 months	,,	Haulier
29	31	8 years	,,	Builder's labourer
30	19	8 years 4 months	,,	Agricultural worker
31	38	—	,,	,, ,,
32	20	9 years 9 months	,,	,, ,,
33	26	6 years 9 months	Probation officer	Errand boy
34	24	—	School	Agricultural worker
35	17	7 years 10 months	,,	Hotel kitchen worker
36	16	9 years 2 months	,,	Agricultural worker
37	46	—	,,	,, ,,
38	19	5 years	School	Errand boy
39	26	8 years	,,	Agricultural worker
40	39	—	,,	,, ,,
41	23	7 years 6 months	,,	,, ,,

(*b*) *Unsuitable for Work (179 Cases).*—These are usually cared for in their own homes. The parents or relatives with whom they are living find that they can deal with their physical needs, but require a varying amount of guidance and assistance from time to time in dealing with the special problems associated with the mental defect. In addition the occasional contact as provided by the health visitor at quarterly intervals is found to have a stabilizing effect.

(*c*) *Suitable for Work (48 Cases).*—Some 41 males and 7 females were employed in full-time work bringing in a reasonable wage, and 44 of the 48 cases were ascertained from the school records, whereas cases ascertained from other sources did not fit into this group. As will be shown later, this fact is by no means without significance in view of the changes introduced by the new Education Act.

Of 114 males 41 were in gainful employment, and 20 of these were engaged in agricultural work. Many of these men have low mental ages, but inquiry has shown that in spite of this they are able to drive tractors and to perform other tasks of farming which are by no means monotonous. No useful purpose would be attained by drawing attention to occasional cases where the defective was found to be drawing a high wage in a factory, a sum in excess of the wages of the health visitor carrying out the supervision. A defective with a mental age of 8–9 years is able to do certain repetitive work in a factory, but this does not seem to be a state of affairs to be encouraged, by reason of the ever-present danger of powerful and rapidly moving machinery. It is difficult to see how a boy with a mental age of 7–8 years can make a checker in a railway goods department. Even those working as errand boys provide something of a problem, but it has been explained to me that they memorize the whereabouts of the customers without reading the addresses. Those described as colliers were found to be only surface workers employed in sorting and grading the coal.

TABLE II.—*Female Mental Defectives under Statutory Supervision*

No.	Age	Mental Age	Source of Ascertainment	Employment
1	28	—	Public Assistance Committee	Factory worker
2	20	6 years 6 months	School	,, ,,
3	48	—	Public Assistance Committee	Domestic ,,
4	18	8 years 3 months	School	,, ,,
5	31	—	,,	Laundry ,,
6	27	7 years 4 months	,,	Factory ,,
7	20	10 years 6 months	,,	Domestic ,,

Out of a total of 113 adult females only 7 were found to be engaged in work away from home bringing in a reasonable wage. These were all doing domestic work of one sort or another, either in private houses or in factories. Needless to say, many others of the remaining 106 worked in their own homes, taking on quite substantial domestic responsibilities; but, since there is no means of accurately assessing the value of this work, these have been disregarded.

Discussion

Since the great majority of ascertained mental defectives who subsequently have been shown to be employable are ascertained in school, it is clearly of the utmost importance to safeguard against any stigma such as was present under the classification required by the Education Act, 1921. Under the new Education Act it will be the duty of every local education authority to ascertain the children within their area requiring special educational treatment. The parent of the child may be required to present him for examination by a medical officer of the local education authority to determine whether he is suffering from any disability. It would appear that the child will hold a status of educational disability rather than acquire the label of a mental defective.

As regards the legal status of the adult, it would appear that he is either a certified mental defective or not, and, where he is an ascertained mental defective, presumably he has full legal capacity.

From study it has been found that those ascertained mental defectives in employment are conscientious and industrious, and in many cases use the money they earn to help maintain the household. The jobs at which they are employed are real and necessary contributions to our mode of life. They are not really misfits in the community; it is rather that in the normal peacetime labour market they are unable to get the jobs for which they are best suited. Kannar (1942) suggests that these persons should be described as of "intel-

lectual inadequacy" rather than of mental deficiency. He points out that the mental defective in the true sense of the word has no place in the war effort of the United States of America, but that the majority of the "intellectually inadequate" can very well be integrated into the defence industries.

The Central Association for Mental Welfare, in its 21st annual report (1934), considers that ascertained mental defectives can only be supervised in the community so long as this is done by trained workers, and where facilities are available for occupation and training. From the findings of this study, however, it would appear that with favourable conditions some ascertained mental defectives can find and keep employment, when this is made available to them, without the intervention of trained social workers.

Possibly the position is overstated by Dayton and Nugent (1941) in claiming that institutionalization should be the last resort when all other efforts have been exhausted. Rather what is wanted is some system of assisting these persons to find suitable employment near their own homes, as was done years ago in New York City, where a bureau was established to place such persons in suitable gainful employment—see Davies and Williams (1930). In addition to this some financial aid should be provided by the State, as in the case of blind persons; this would indeed be cheaper than institutionalization, and might well be included in any comprehensive system of social security. Further, it has been said that institutional training tends to adapt the defective to the institution rather than to the outside community. Supervised life in the community and assistance to find suitable employment with financial aid in peacetime would train a greater number of ascertained mental defectives who are intellectually inadequate to adapt themselves to the environment of the community and to become responsible and useful citizens.

Summary and Conclusions

Out of a total of 227 ascertained adult mental defectives under supervision in Gloucestershire some 48 are now in full-time gainful employment.

Out of this total of 48 cases in employment 44 were ascertained in school. This emphasizes the importance of the status given to such children by the new Education Act, in which they are regarded as children with an educational disability.

For male defectives farm work is the most popular, and by reason of labour shortage they are now able to secure such employment.

In peacetime conditions, however, they will once more fall out of employment, and it is therefore suggested that they should receive assistance to find suitable jobs and, if necessary, financial aid in order that they may have the opportunity of fitting in with any comprehensive system of social security.

I am indebted to Dr. H. K. Cowan, county medical officer, for his help and for permission to publish the results of these investigations.

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HOME AMBULANCE SERVICE

The Home Service Ambulance Committee of the Order of St. John and the British Red Cross Society in its twenty-fifth annual report recalls that the committee was set up in April, 1919, as an experimental measure, to provide a chain of ambulance stations throughout the country, primarily to serve the needs of rural areas. By October of that year 296 ambulances had been allotted and 171 delivered. To-day the total number of ambulance stations is 530—131 equipped by the committee and 399 affiliated stations. The report, though unavoidably delayed (it covers the year 1943), provides ample evidence of the value of the service to the scattered population of country areas. During the year 297,864 patients were carried, bringing the total number using the service since it started to 3,173,658. In an accompanying letter the committee's joint secretaries refer to comments that have been made on shortcomings in existing ambulance services. They point out that the Home Ambulance Service is administered throughout England and Wales on a county basis with headquarters in London, and the organization lends itself readily to any regional or national scheme.

"The service, free from red tape, is always ready to meet emergencies as they arise. No ill-judged rules or regulations as to areas or boundaries are permitted to delay the prompt aid that may mean the difference of life or death to the patient. In such a service the welfare of the sick and injured must be the first consideration. These ambulances work in a field where they are self-dependent, to a very large extent, for the preparations of the patients for safe transport. They must not only be equipped with first-aid materials and sick-room requisites, but must include staffs trained and qualified to deal with casualties and invalids under the most difficult conditions. It is for just such work that the training demanded by the Order of St. John and the British Red Cross Society equips their members. Duties are more or less evenly divided between the men and women of the divisions and detachments. The nurse escort is an aspect of the work which has been developed considerably in recent years, and with the return to normal the ambulance staffs of the Order and the Society will be available as a trained and sympathetic body of men and women ready to take their place in the National Health Service."

AWARDS TO CIVIL DEFENCE M.O.s

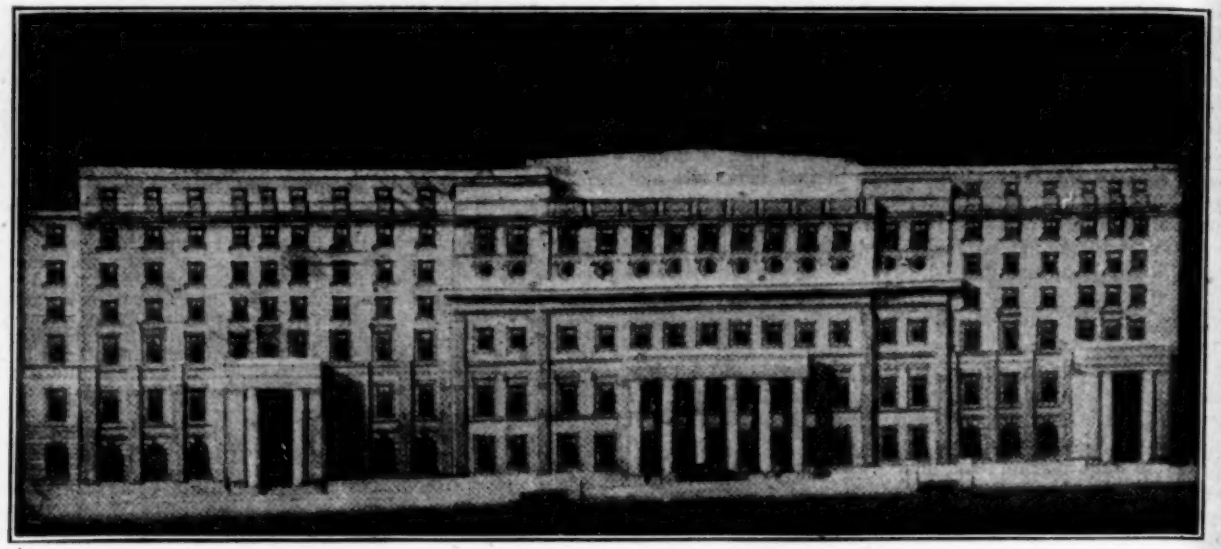
The *London Gazette* has announced the appointment as M.B.E. (Civil Division) of Dr. Una Mary Mulvany (Mrs. Swanston), medical officer in charge of first-aid post, Civil Defence Casualty Service, Southsea, and Dr. Tertius Thomas Bryce Wood, officer-in-charge of mobile unit, Civil Defence Casualty Service, Watford. The citations read as follows:

Dr. Mulvany has been on duty during every heavy raid and has always been on her way to duty within seconds of the first bomb falling, never waiting to be called. By her unfailing courage and complete disregard of danger she has set a wonderful example, and her kindness and cheerfulness have given great comfort to many. On one occasion when a building received a direct hit Dr. Mulvany immediately went to the scene. She worked her way through the debris to reach three people who were trapped in the cellar and administered morphine to them. Although she must have known there was imminent danger of the place collapsing, she remained with them for nearly two hours.

A flying bomb damaged houses and people were trapped. During the early stages of the rescue work walls were still collapsing and fires were burning. Dr. Wood took risks on many occasions in order to administer morphine to the injured trapped in the debris. His cheerful leadership and devoted service were an inspiration to the other rescue workers, and his efforts not only contributed materially to the saving of life but were a real source of encouragement to the trapped persons.

ORTHOPTIC TEACHING AND TRAINING

Orthoptic treatment has been on a scientific basis for ten to fifteen years. Formerly attempts to improve binocular vision were rather half-hearted and limited to the practice of a few progressive ophthalmic surgeons. Maddox devoted a great deal of time and energy to the subject, and, by his recognition of the difficulties and his systematization of treatment, may be regarded as the founder of the orthoptic treatment of to-day. The main object is to awaken a dormant or to stimulate a weakened desire for binocular vision. Undoubtedly there are cases where the mechanical difficulties presented by the alignment of the eyes, non-cooperation on the part of the patient, or the absence of any central area capable of response make all attempts to train binocular vision hopeless. Setting aside such cases, a large proportion of the remainder can be given full or nearly full binocular vision. The benefits to be derived from it, apart from the cosmetic effect, are such that the long and arduous training sometimes required is fully justified. The value of accurate depth perception, which accompanies full stereoscopic vision, is likely to be enhanced in the future when, it may be assumed, we shall take more and more to the air as a means of transit. Without depth perception judgment of distance is impaired and accurate landing of aircraft a hazardous proceeding. The work of the orthoptists attached to the R.A.F. may be cited as an indication of the importance of this field; by the use of orthoptics not only are men eliminated who are unlikely to be able to fly, but confidence is restored in those who, through stress and strain, find that flying is becoming difficult. Orthoptics is practised by medical auxiliaries who are certificated and registered. They are usually women, and before being trained they must give evidence of a certain educational standard. A course of about two years' training is followed by an examination consisting of written papers and practical work, the questions being set by ophthalmic surgeons and orthoptists, and the practical tests being carried out by orthoptists under the supervision of ophthalmic surgeons. On the results of this examination a certificate is granted by the Council of British Ophthalmologists. Orthoptists have to conform to a code of ethics agreed upon by the C.B.O., and everything is done to maintain the dignity of the profession. That the British Orthoptist Society is a live body is shown by its publication, the *British Orthoptic Journal*; the current number for 1944 contains many outstanding papers of interest to ophthalmic surgeons and orthoptists.



A COMMON COLLEGE SITE IN LONDON

Recent correspondence in the *Times* gives a fillip to a project which has been occupying many minds during the past two or three years. In essence the idea is to house the Royal College of Physicians of London, the Royal College of Surgeons of England, and the Royal College of Obstetricians and Gynaecologists on adjacent sites. It has been considered by the Standing Joint Committee of the Royal Colleges, which believes that common action of the three Colleges and closer relations could thereby be promoted. There can be very few to-day who would deny this as a general proposition.

The Lincoln's Inn Fields Site

The Royal College of Surgeons now owns the freehold of Nos. 35 to 45, Lincoln's Inn Fields—a site approximately twice as large as that occupied by the College buildings before the war. It also owns two other houses on the south side of the square, though these do not quite adjoin the main site. The Council of the R.C.S. favours the development of this site as the home of the College, while adhering to its view that to achieve joint buildings is more important than any considerations of geographical position. In its last annual report (1944) it reaffirms its willingness to consider any proposal for moving elsewhere, but feels that the Lincoln's Inn Fields site has great advantages, and that these should be most seriously considered and not lightly rejected. It must be satisfied that removal from the present site would have overwhelming advantages, for it regards Lincoln's Inn Fields as being a satisfactory situation for the numerous activities of the College and as being known throughout the world as the home of the Hunterian Museum. It is, however, prepared to make big sacrifices if convinced that a move is necessary or advisable for the promotion of better relations and facilities between the three Royal Colleges.

In short, the Council of the R.C.S. would like Lincoln's Inn Fields to be the site of a common Collegiate Centre because of its favourable circumstances and amenities and its accessible position, and earnestly hopes that this view will prevail. But it is a matter of great urgency for the R.C.S. that a decision should be made. The part of the College still intact is being put into working order to provide for the impending return of the research laboratories and to give accommodation for the new professor of human and comparative pathology. There is also a pressing demand for facilities for the restoration of museum specimens, the repair of material from dispersed centres, and the care of such new material as is reaching the College. The damaged museum halls will soon have to be put into commission to house new specimens promised from all parts of the world and to accommodate the 27,000 specimens now stored in this country. In addition to parts of the College only needing restoration there remain the parts of the original site which were occupied by buildings completely destroyed by enemy action in May, 1941. This space is now available for reorganization, and can be planned to give accommodation both for common use by all the Colleges and for the specific use of each. The R.C.S. is also prepared to arrange its rehabilitation so as to put to joint use existing or restored facilities, such as museums, laboratories, and libraries.

To give some idea of how combined buildings might be laid out on the site a ground-plan has been prepared for the R.C.S., and also a design of a suggested façade (reproduced on this page). The architectural plans were drawn with the idea of showing one of the possible ways by which the required accommodation could be provided. It is the hope of the Council of the R.C.S. that the other Royal Colleges in London may agree to move to Lincoln's Inn Fields and combine in forming a medical centre.

The greater the age of an academic body the harder becomes its decision in a matter of this kind. The Royal College of Physicians of London—by far the oldest medical college in this country, for it was founded by Henry VIII in 1518—has moved house three times during its long history, and the Fellows are naturally and properly concerned lest in any further move it may lose something of its autonomy and its prestige. But there is much to be said for a collegiate medical centre in London and for physical juxtaposition. Those who take the long and the wide view will welcome the general conception of a joint site and be glad that it is now under discussion in the public press; they will be encouraged by knowing that Lord Dawson, who was for seven years President of the R.C.P., has announced himself in favour of the plan, subject to all necessary precautions.

The Present R.C.P. Building

Sir Stewart Duke-Elder reopened the whole matter in the *Times* on Jan. 10 with a letter which linked the question of a central site with his earlier advocacy of a comprehensive Academy of Medicine in London. Lord Dawson, writing in the next day's issue, gave his blessing to the general idea and added some important facts about the Royal College of Physicians and its present site which will be news to most readers and even to many Fellows of that College. Before 1930 the R.C.P. unanimously decided, after expert advice, that its building in Pall Mall East at the corner of Trafalgar Square was unsuited for its purpose and that a new home should be sought. At that time the Canadian Government was seeking to enlarge its Dominion offices, and for this purpose desired to buy the adjacent R.C.P. building. By 1934 negotiations for the sale of the College site were nearly complete, when a change of Government in Canada stopped the negotiations, though the new Canadian Prime Minister and High Commissioner retained their active wish to secure the R.C.P. site for an addition to Canada House. Lord Dawson recalls that the Joint Committee of the three Royal Colleges, which was formed in January, 1942, decided unanimously that the securing of a single site for the Colleges was of more importance than the qualities of any particular site. "But the war seemed to

obstruct any such scheme until by a fortunate turn the Royal College of Surgeons saw the opportunity for a bold initiative and seized it. . . . It is a rare opportunity for the realization of a great idea and does credit to the man who conceived it. The present Canadian Government is still wishful, subject to negotiation, to purchase the R.C.P. building, and it has made this fact known to the President of the Royal College of Physicians, with the wish for its general knowledge. Surely the unrivalled opportunity offered by this Lincoln's Inn Fields site should be studied carefully."

Reports of Societies

B. COLI PYELITIS: DIAGNOSIS AND TREATMENT

At a meeting of the Section of Surgery of the Royal Society of Medicine on Jan. 3 the subject of discussion was "The Diagnosis and Treatment of *B. coli* Pyelitis." Sir JAMES WALTON presided.

Pyelitis in Infancy

Dr. WILFRED SHELDON said that pyelitis might be met with in children's hospitals even in the first week of life. It was most common in childhood in the first year. Not infrequently it arose as a secondary disease, and the most common predisposing influence was gastro-enteritis. In young children also it might arise as a complication of acute otitis media or pneumonia. He did not think he had ever seen a very severe case of infantile scurvy that had not also got pyelitis. In primary cases the temperature rose 4 or 5°, and there was a day's swing of perhaps 3 or 4°. In young children there might be convulsions and rigors; vomiting almost invariably occurred. In young children restlessness and irritability were very marked; in older children irritability was likely to be replaced by headache and pain in the loins. Pain was not a prominent symptom, but in some cases there might be severe attacks. Errors of diagnosis would continue to be made so long as the routine examination of the urine was omitted from the clinical examination.

Before the appearance of the sulphonamides, acute *B. coli* pyelitis was treated with alkalis, usually with conspicuous success. The sulphonamides were such efficient sterilizers of the urine that they would often exert their effect in the presence of urinary stasis. In acute pyelitis, when there was no opportunity of indicating whether urinary stasis was present or not, if these drugs were used as a first line of attack they should be followed by routine pyelography lest some underlying cause was being overlooked. It was his practice to continue to treat these children by means of alkalis, and, if these failed, then to go on to sulphonamides, and later to investigate this particular group by pyelography. Among the sulphonamides his personal preference was for sulphathiazole, and the amount aimed at was 0.2 g. per kilo per day. He gave a small dose of alkali with each dose of sulphonamide to assist toleration. *B. coli* was in the group of organisms insensitive to penicillin, and therefore its use was not likely to be beneficial.

Pyelitis in Adults

Mr. E. W. RICHES said that two main clinical varieties must be recognized—namely, acute or subacute, and recurrent. So-called chronic pyelitis was always a pyelonephritis with tubular involvement, and often the name "recurrent pyelitis" concealed some other lesion which was responsible for stasis continuing. Two principal aetiological factors were concerned in acute pyelitis: (1) lowered resistance, and (2) bacterial invasion. Lowered resistance was often exemplified by a chill before the attack started. Bacterial invasion was generally from the bowel; constipation or diarrhoea gave the clue to its origin, and the infection was usually lymph-borne from the colon. The distinction between pyelitis and cystitis was somewhat arbitrary. If pyrexia or renal pain occurred with cystitis the label "pyelitis" was attached. The symptoms in the acute phase were pyrexia, renal ache, polyuria, frequency, and diarrhoea, and sometimes painful haematuria. The urine was characteristically acid, pale, of low specific gravity, with an unpleasant odour, and a surface sheen which developed on standing. Response to medical treatment was evidence of the correctness of the diagnosis.

Treatment of the acute case was rest in bed, warmth, copious fluid intake, attention to the bowels, and alkalis in large enough doses to make the urine alkaline. When the temperature had been normal for some days the continued presence of *B. coli* or pus demanded a course of either one of the sulphonamides or mandelic acid. The sulphonamides were more rapid in their sterilizing effect. They acted in about half the time taken by the mandelates. The drugs were not always well tolerated, and might give rise to nausea and vomiting. Efficiency and toleration seemed to be best combined in the use of sulphadiazine. For a pure *B. coli* infection he found mandelic acid more generally useful than the sulphonamides, though it also was unpleasant to take. It could safely be ordered for an ambulant patient. For the speediest cure sulphonamides should be given with alkalis from the outset.

In the diagnosis of the recurrent or persistent case, the trauma or other cause keeping up the infection might lie in the urinary tract itself, or in the genital or intestinal tract. As the lesion was most commonly found in the urinary tract investigation should, as a rule, start there, and the most useful starting-point was an intravenous pyelogram. He preferred to do this before cystoscopy. Any lower urinary tract obstruction would be discovered on cystoscopy, if not before, and any lesion in the bladder, such as new growth, diverticulum, or stone, would be found. Retrograde pyelography was carried out at the same time if the previous excretion pyelogram indicated the need for so doing.

Uncomplicated acute pyelitis due to *B. coli* would respond to medical measures. Instrumentation played little part in its treatment. The effective urinary antiseptics were mandelic acid and sulphonamides. A patient who did not respond to a properly given and supervised course of treatment should be regarded as having some other lesion. The persistence of pus cells after the urine had been sterilized was a warning that recurrence of infection was likely.

Pyelitis associated with Child-bearing

Mr. DOUGLAS MACLEOD said that some degree of pyelitis occurred in about 1% of all pregnant women. This was undoubtedly due to certain physiological conditions in pregnancy, especially the marked atony of the ureteral muscle, which had been shown to occur as early as the eighth or tenth week. The effect of compression, especially on the right ureter, had to be reckoned with; in a pyelogram taken at the twenty-fourth week the right ureter would in most normal pregnancies be seen to be much dilated, and this dilatation affected the calices and ceased abruptly at the pelvic brim. The ureter was also kinked in the middle and upper thirds. Dilatation due to atony occurring early in pregnancy affected the left ureter equally with the right; dilatation due to compression affected, as a rule, the right ureter. The cause of the muscular atony was thought to be the presence of a hormone with an inhibitory influence on all plain muscle. In diagnosing pyelitis in pregnancy the difficulty was its occasional confusion with appendicitis. An outstanding symptom might be extremely severe vomiting. With regard to treatment, many obstetricians preferred sulphanilamide; he himself used sulphathiazole and sulphadiazine, though there was a danger of the drug crystallizing out in the tubules. Infections in the puerperium were common and were treated with sulphanilamide. This was excreted in the milk, but did not seem to cause any harm. Finally, he pointed out that although mild cases of pyelitis were common in pregnancy, and often overlooked, the acute severe form was rare. At Queen Charlotte's, out of 1,500 deliveries in a recent year, there were only six cases.

A Pathologist's View

Dr. HOWARD HUGHES said that there was a minute but rapidly growing group of cases in which all forms of therapy seemed to fail. The general practitioner had given courses of a sulphonamide, alkaline mixtures, and so forth, and had finally sent the case to a surgeon or physician, by which time either the micro-organism or the patient was unsuitable for any further chemotherapy. Here the laboratory could help by adding something to a case in which it was known that the patient had already had treatment for some time. The pathologist could say whether a particular strain found was sensitive or not to the favoured drug of the physician with whom he was co-operating. There was no difficulty in adding the *in vitro*

information. He added that in *B. coli* pyelitis a mixed group of related organisms were concerned which were not antigenically all the same.

Mr. WINSBURY WHITE said that it was the recurrent cases into which they wanted to probe.

A man of 35 was sent to him some months ago with the history that he had had an attack of cystitis and pyelitis, with *B. coli* found, but that this had cleared up, leaving him with chronic frequency and pain at the end of passing water. The pain was very worrying, and the practitioner wanted to know whether the man had stone in his bladder. The patient said that for years preceding his attack he had bouts of frequency of micturition. On examination a number of tags of inflammatory tissue were found in the posterior urethra. He saw the patient three weeks afterwards, and then his frequency was much reduced and his dysuria had disappeared completely. The bouts of frequency suggested a focus of infection somewhere near the neck of the bladder, fluctuating in intensity from time to time until eventually one of the bouts went further and caused cystitis and an attack of pyelitis.

It seemed to him that some of these cases settled into chronic pyelitis. In the female often everything appeared normal except for a patch of inflammation in front of the trigone. The urethroscope showed invariably chronic inflammation there as well, and it was quite common for early cases to clear up merely as a result of the instrumentation, though this must not be expected in severe cases.

Route of Infection

Mr. JENNINGS MARSHALL asked where was the source of infection and how did the infection reach the urinary apparatus. It could arrive either by the lymphatics or by the blood stream. The *B. coli* group of organisms could be excreted by the kidneys alone, and therefore a blood-stream route need not surprise them. The source of the coliform group must be the bowel at some point. For years people had talked about the passage of these organisms through the intact bowel wall, but was there any part of the bowel which was constantly being lacerated? There was such a part in the anal canal, which was very subject to laceration, as, for example, when affected by piles or by cryptitis. On the top of these frequent lacerations was the important factor of muscular spasm. Here, then, was a means of the infection getting into the system, whether by the blood stream or by the lymphatics.

Mr. KENNETH HERITAGE considered that the value of alkalization of the urine ought not to be forgotten with the advent of the sulphonamides. Alkalis had given patients great symptomatic relief when sulphonamides had failed. He also referred to the pyelitis which occasionally followed the use of instruments in urology. Do what they would they could not always avoid this complication. Instrumentation might render patients more prone to fall a prey to their bacteriaemia. He emphasized the value of the prophylactic use of sulphonamides as a means of preventing post-instrumentation rigor.

Mr. HAROLD DODD declared himself a rebel in that he believed in intensive acidification, giving acid in the same way as alkalis were given. In his experience this worked well; he put it forward not as a routine treatment but as something worth trying. The daily intake of fluid played a big part in this condition, and the measurement of the fluid was as important as the measurement of the quantity of drug the patient was given. All milk should be boiled: there was no reason why the patient, having to grapple with his own bacteria, should have to grapple also with those of the cow.

Analysis of Cases

Dr. H. G. HANLEY presented an analysis of 200 cases of *B. coli* pyelitis in women of child-bearing age—100 consecutive cases in pregnant women and 100 consecutive cases in non-pregnant:

	100 Non-pregnant		100 Pregnant
Congenital lesions	5		5
Calculi	5		6
Hydronephrosis	6		4
Tuberculosis	2		1
Gross genito-urinary pathology	18		16
Previous genito-urinary infection	32		37
Known previous pathology before this attack	46		50
Defloration ("honeymoon pyelitis")	7		—
Urethrotrigonitis	44	(in 16 out of 47 examined)	37
Cases with a possible primary causal factor	69		54

The difference between pregnant and non-pregnant women was insufficient to allow pyelitis of pregnancy to be classed as a disease on its own. Pyelitis was rarely an infection of the kidney; it was usually an infection of the genito-urinary tract. He commented on the decrease in the number of cases of pyelitis in the war years.

The PRESIDENT (Sir James Walton) said that it seemed to him that evidence was accumulating that throughout the body an ascending infection rarely if ever occurred. The infection under discussion seemed to be much more of a septicaemia—a blood-borne infection. He asked what was the ultimate prognosis. What happened in the case of young girls who early in life had been treated for pyelitis? Mr. RICHES replied that many young girls who had had pyelitis in their early years had grown up and passed successfully through pregnancy. He did not think it could be held now that "once a *B. coli* pyelitis, always a *B. coli* pyelitis."

SOVIET SURGERY

Meeting of Anglo-Soviet Medical Council

The Anglo-Soviet Medical Council continues with unabated zeal its work of bringing the medical professions of this country and the U.S.S.R. into closer contact, chiefly by facilitating the interchange of information on professional matters. Among its activities is the publication of a monthly news sheet entitled *Soviet Medical Chronicle*. With the medical professions of both countries so heavily engaged in caring for the sick and the wounded on the many fronts of war, free communication between them must obviously be limited. The success of the work of the Anglo-Soviet Medical Council is in large part due to the untiring patience of its honorary secretary, Dr. Elizabeth Bunbury, who gave an account of her stewardship at the third annual general meeting of the Council recently held at the Royal Society of Medicine, when the President of the Council, Sir Alfred Webb-Johnson, was in the chair. After the ordinary business of the meeting had been completed, Sir Alfred welcomed Prof. N. N. Priorov, Director of the Central Institute of Orthopaedics and Traumatology of the U.S.S.R., and Dr. A. Kotov, Assistant Director of the Ukrainian Institute of Orthopaedics and Traumatology. A translation of Prof. Priorov's address on Soviet surgery was then read by Dr. Charles Wilcocks.

Soviet surgery, Prof. Priorov said, had been able to return to the fighting Services as many as 70% of the casualties. At the front their aim was to provide surgical treatment as close to the front line as possible, and to arrange a high degree of specialization of treatment during the first few hours in the field hospital, with a thorough surgical classification of the wounded according to the nature and type of injury. After classification, the wounded were evacuated to specialized hospitals. The hospital organization comprised a network of specialist hospitals, large surgical departments in all general hospitals, and the 50 medical institutes in the different republics and regions of the Union. Each institute had three chairs of surgery, occupied by a professor specializing in one or more subjects. There were also special central institutes such as the Central Neurological Institute, the Central Institute of Blood Transfusion, the Central Institute of Orthopaedics and Traumatology, and the Central Tuberculosis Institute. These institutes carried out research and served as centres of information for peripheral institutes. The Commissariat of Health had formed a Scientific Council to act as a clearing-house to co-ordinate research work and to make the advances known to the medical profession. Each year this Scientific Council had submitted to it scientific work done by the large hospitals, clinics, and institutes, and the research problems indicated by them and by the People's Commissariat of Health. There were also a Hospital Council at the Commissariat of Health, and a Scientific Council of the Medical Administration of the Red Army. An Academy of Medical Sciences had just been established.

Much work had been done on the bacteriology and chemistry of wounds. Tens of thousands of wounded had had secondary suture performed 8, 10, 12, or even 20 days after injury, with satisfactory results. Sulphonamides, and recently penicillin, had been used extensively. In the treatment of fractures the

apposition of the bone fragments was considered as urgent as operation on a strangulated hernia. The problem of osteomyelitis after gunshot wounds was far from being solved; mere sequestrotomy or curettage was insufficient; transverse or lateral resection of the affected part should be carried out. In the treatment of injury of the peripheral nerves they did not favour transplantation when there were defects of nerves and the ends could not be approximated: they advocated plastic operations on the muscles, and suitable orthopaedic devices. A number of orthopaedic operations were performed in the network of hospitals established for surgical rehabilitation. The percentage of amputations had been diminished by half, as compared with the war of 1914–18. Prof. Priorov mentioned the case of a doctor who had lost both arms, one above and the other below the elbow: after being supplied with artificial limbs capable of movement, he was able to look after himself, use a typewriter, and perform the duties of a public health inspector. He concluded by expressing a hope for still closer contact and a fuller exchange of views and experience between the medical professions of the U.S.S.R. and Great Britain.

Correspondence

In Aid of Russian Wounded

SIR,—The Joint Committee for Soviet Aid has been granted official permission to hold a flag day in the Greater London area on Red Army Day, Feb. 23, which will mark the 27th anniversary of the foundation of the army of our Russian allies who during this winter have faced more than 220 German divisions on the Soviet-German front.

To rehabilitate hundreds of thousands of wounded is one of the new tasks facing Soviet surgeons. If all the equipment, apparatus, and special hospitals needed for this can be established:

35% of the war invalids can be completely rehabilitated and ultimately return to the ranks of the Red Army.

30% of these invalids can return to their previous civilian occupations.

Others can, after special training and re-education, be employed in various suitable occupations instead of feeling themselves unable to play their full part in the life of the community.

The proceeds of this flag day will go to help provide rehabilitation equipment for the Red Army wounded. As flag days are also being held very widely throughout the Provinces may I appeal to all members of the medical and nursing professions to give every support possible during Red Army Week and on the flag day itself.—I am, etc.,

P. CHALMERS MITCHELL,
Hon. Treasurer.

Joint Committee for Soviet Aid,
171, St. Stephen's House, Westminster, S.W.1.

Relation of Neurology to Psychiatry

SIR,—Dr. Shepley (Dec. 23, p. 833) writes of the "total absence of demonstrable organic lesions such as are constantly sought but rarely found concomitant with gross examples of mentally disordered states." This statement is incorrect, for in my experience organic lesions of the cerebral vessels are generally demonstrable in brains from mentally disordered patients. Neuron lesions may also be found, especially where neurological signs have been present, although they do not affect the problem, as I have pointed out that clinical recoveries, remissions, and lucid intervals obtaining after many years' mental illness establish the integrity of that part of the nervous system subserving the recoverable mental function. The mechanism at fault is that which governs neuron stimulation thresholds, thus determining the paths of sensory impulses through reflex arcs to give desired responses—namely, the pattern of blood flow in the cerebral capillaries—and the "recent notable advances (as well as the older methods) in psychiatry in treatment by physiotherapeutic methods" all depend upon changing local cerebral blood flow.—I am, etc.,

F. A. PICKWORTH.

Birmingham.

Nursing of Tuberculosis

SIR,—The letters of Dr. Snell (Dec. 9, p. 768) and Dr. Wingfield (Dec. 30, p. 867) following your annotation on the nursing of tuberculosis call for comment. As a result, we suppose, of two misprints little can be said about the figures in Dr. Snell's letter; but when those he quotes from the Prophit Survey report by Daniels are corrected they remain misleading. He says that in the Mantoux-negative group of that survey (452 not 42) 33 developed tuberculosis. In fact there were 12 cases of clinically active pulmonary tuberculosis and 1 of non-pulmonary tuberculosis. The remaining 20 were primary manifestations, including 6 pleural effusions. The recommendation made by Daniels is that tuberculin-negative nurses should not nurse in the tuberculosis wards of *general hospitals*.

Dr. Wingfield appeals for wide publicity of the dangers of nursing tuberculosis. We feel that narrow publicity among those responsible for the health of hospital staffs would be more useful and less likely to diminish even further the number of entrants to tuberculosis nursing. The burden of the American paper he quotes is a plea for a better scheme of health control for hospital workers.

Now that the habit of repeated tuberculin testing and radiological examination is spreading, primary tuberculous infection is increasingly often recognized. And as primary tuberculosis is normally a benign condition, even in the young adult, it is high time that the difference between primary tuberculosis and progressive pulmonary tuberculosis—phthisis, if you like—was generally and officially recognized. This differentiation has been advocated in a recent editorial in *Tubercle*, and in a scheme of classification devised by Houghton.

In the present state of tuberculous infection in this country virtually all the girls who are Mantoux-negative when they start nursing would become Mantoux-positive within the next ten years, whether or not they nursed tuberculosis. We believe that a sanatorium is as good a place as any other in which to acquire tuberculin sensitivity. A paper on the subject is in preparation by us, but our reasons for this belief may be stated briefly.

1. There may be something in the theory that a massive infecting dose is dangerous. This is less likely to be received from well-trained patients in open-air conditions with a known risk and consequent precautions than from the unsuspected case in the ill-ventilated ward of a general hospital.

2. A well-planned scheme of staff health control should ensure the early recognition of primary infection, and the necessary steps can be taken to prevent the development of progressive pulmonary tuberculosis.

3. The general health and physical condition of the sanatorium nurse are commonly better than those of her opposite number in a general hospital.

Finally, may we deal with a purely practical point. Approximately 25% of our student nurses are Mantoux-negative on entry, so if we excluded these we would only have to close down about a fifth of our beds. When the age of infection is postponed as late as it is in some parts of America, we might have to turn down 84% of applicants. What happens then?—We are, etc.,

PETER W. EDWARDS,
A. CLARK PENMAN.

Cheshire Joint Sanatorium, Market Drayton.

Prisoner-of-War Mentality

SIR,—I have been interested in the correspondence on the prisoner-of-war mentality. At the beginning I was tempted to write and suggest that the psychological treatment necessary would be more valuable if directed to the wives and families of returned prisoners-of-war in teaching us the necessary attitude which must be adopted by those of us who have been waiting with varying degrees of impatience for their ultimate return.

Major Charters's letter (Jan. 6, p. 24) is of great comfort to me, as I have had anxiety about a neurosis engendered by enforced idleness, and it may be of interest to others to know that I have just received a letter, the first for three years—one hundred words in capital letters—from my husband, who is in Japanese hands. He says: "I am in good health but very weary of this kind of existence. *Fortunately* there is plenty of work to do and mind is kept fully occupied." I make

the emphasis as I think it reveals my husband's desire to dispel what he knew would worry me most about his own case.

He is a psychiatrist in the R.A.F., and I feel that the problems of incarceration will be adequately dealt with so far as he is able to organize activity in his own camp (Osaka). There must be other doctors who are aware of the dangers and doing yeoman service in the camps.—I am, etc.,

I. MAGRATH.

Aggressive Impulses in Progressive Society

SIR,—In recent work carried out among the neurotic, and to a lesser extent among the psychotic, the delinquent, and the criminal, there is some evidence to think that the primary stimulus in all individual breakdowns is to be found in the environment in early life, and that such stimulus is invariably associated with exploitation in some shape or form which had generated a store of infantile hate so primitive as to be quite unpermissible to the developing adult; it has had to be locked away in the psyche and has constituted a danger to the individual, for he has become more vulnerable to such a type of stimulus later in life. The factor of exploitation is also to be reckoned with where a breakdown occurs in social or international relationships.

A confirmation of this is to be found in a book published in 1934 by an American psychiatrist, Dr. F. E. Williams, entitled *Soviet Russia Fights Neurosis.* The author gave his views on what was wrong with the world, and what preventive measures might be adopted which would lessen unhappiness in general and the incidence of neuroses and psychoses in particular. He had much praise for the Russian realistic approach to this subject, and contrasted their methods favourably with those of America. He said that the Russians recognized the importance of environmental factors for the happiness of every citizen or group of citizens. He pointed out with what success they had organized a society where the normal aggressive impulses bound up with growth and expansion were allowed to flourish so far as possible without interference, so freeing the constructive impulses without the inhibiting infiltration of hate—an effort towards a preventive form of therapy.

He regarded exploitation, however subtly applied, and the guilt and hate generated thereby, as largely responsible for individual and social unrest, and warned his readers of what would happen if world affairs were allowed to continue to drift. His prophetic words of 1934 passed unheeded at that time, but may well be re-read in the light of subsequent world happenings, especially now that some of our own psychiatrists have to a large extent confirmed his findings, and as there is now a need to plan for a future peace. The book asserts that for a realistic basis of life man must accept and trust his own tendency towards aggression: "We must be free to be aggressive; the question is how to manage this aggression and how to turn it to social account. Man must learn to use his aggression in a constructive, positive way." Energy bound up with the free liberation of aggressive impulse lies behind all progressive growth, whether of child, adult, or State.

In the light of such evidence, were we to search for a satisfactory world ideology it might be found to be worth while to remember to imitate Russia in this respect: to make an effort to purge our social life of old worn-out pre-war conceptions based so largely on exploitation of the less well-informed by the better-informed; to do away with a secular system that encourages one section of the community or one nation to batten upon and exploit another, and a religious system that hoodwinks the unintelligent and postulates that the dead can exploit the living; and instead to attempt to build an ideology based upon mutual service rather than on mutual exploitation, and found a society less influenced by "fear of the dark." Society would be all the better if it could become completely adult, freed from fears, bogies, and superstitions associated with infancy, which have hitherto through the ages dogged its footsteps. Only then shall we be able to live an adult life along reality lines, guided by a religion that preaches happiness in this world, and not unhappiness here as a necessary preliminary to a problematical happiness in a problematical next world.—I am, etc.,

London. A. CYRIL WILSON.

Artificial Insemination

SIR,—The child born as a result of extramarital artificial insemination is an illegitimate child, and has no right of succession; moreover, if the child is registered as the offspring of a married couple, when in fact it is only the child of one of them, the law of the land is broken, and the doctor who performs the operation of artificial insemination is surely an accessory to the misdemeanour.

If it is desirable for the wife in a childless marriage to have a child as the result of artificial insemination is it not theoretically just as desirable that the husband in a similar marriage should have a child by another woman, and by a false declaration declare that the baby is the child of himself and his wife? The view of the courts on this aspect of the problem was demonstrated not so long ago, when a doctor was charged with having registered two children as the offspring of his wife and himself, although in reality they were his children by another woman; for this offence he was committed to prison and his name removed from the *Medical Register* by the General Medical Council.

It has been maintained in this correspondence that adoption of children is not the answer to all childless marriages, but in the course of what is now a fairly long experience in paediatrics I have found that such a procedure has almost always been a pronounced success. The few failures have been in those instances in which some time after adoption the child was found to be suffering from some congenital disease or was a weakly child—failures which can usually be guarded against and which do not justify recourse to artificial insemination. The success has not even been diminished in those not rare instances in which, after having adopted a child, the mother and father produce one of their own.

Many of your correspondents appear to think that the Church, and particularly the Roman Catholic branch of it, should not have any say on this subject, but matters concerning personal conduct, the sanctity of the home, and the married state are vital concerns of the Church. Nevertheless, whatever the Church as a whole may or may not say on this subject, it seems quite clear that those "who profess and call themselves Christians" can have no part in the practice of extramarital artificial insemination.

Apart, however, from the Christian standpoint on this subject, those who argue in its favour indicate thereby that in their view the father has no responsibility for training and care of the child which he has helped to create, and that his sole role in the business is that of a more or less wholesale provider of semen. Surely such an attitude is indefensible, since both mother and father should bear an equal responsibility for the life which together they have launched upon the world, and it is clearly the duty of doctors to impress this fact upon potential parents.—I am, etc.,

Birmingham. LEONARD G. PARSONS.

SIR,—In this discussion the relation between artificial insemination and masturbation has been dealt with, and obviously other sexual aberrations, such as sodomy, are not ungermane to the subject. Since you published a letter from me in your issue of Dec. 9 I have had an opportunity to read Dr. Julian Huxley's volume, *The Uniqueness of Man* (Chatto and Windus, 1941). This eminent zoologist emphasizes from the beginning of his work that the individual exists not for himself but for society. "If civilization," he says, "is to re-create itself after the war, it can only do so on the basis of what, for want of a better word, we must call a social outlook. . . . To the biologist, who is not afraid of being a humanist as well, *the essence of human life* is seen in *social* relationships" (my italics). In his first chapter, "Eugenics and Society," Dr. Huxley stresses the value for eugenic experiment of separating "the individual side of sex and reproduction from the social side"; otherwise of separating "sex from reproduction," nay, of separating "love" from reproduction. "The perfection of birth-control technique," he says, "has made the separation more effective; and the still more recent technique of artificial insemination has opened up new horizons by making it possible to provide different objects for the two functions. It is now open to man and woman to consummate

the sexual function with those they love, but to fulfil the reproductive function with those whom on perhaps quite other grounds they admire." Dr. Huxley proceeds even further, and maintains that "unless we alter the social framework of law and ideas so as to make possible the divorce between sex and reproduction, or, if you prefer it, between the individual and the social sides of our sexual function, our efforts at evolutionary improvement will remain mere tinkering, no more deserving the proud title of eugenics than does the mending of saucepans deserve to be called engineering." From these quotations it would appear that this writer in removing what he calls "love" from the social field does not consider it as belonging to "the essence of human life."

It has always, I think, and everywhere, until these latter days, been held that man's two essential functions were self-maintenance and race-maintenance, and that the sex functions existed for the latter purpose. Even the aesthetic paederasts of Ancient Greece and Rome would hardly have claimed that their sensual indulgences subserved "eugenic" ends. It would be valuable if readers having a better acquaintance than I with Dr. Huxley's writings would explain what he means by "love" in this connexion, since on that would seem to hang most of his argument.

To not a few of us the process of analysis *à outrance* which characterizes modern science, particularly biological and sociological science, seems to have played, and to be playing, a major part in that break-up of Western civilization which we now see at its climax all around—I mean, in the present war.—I am, etc.,

North Queensferry, Fife. A. J. BROCK.

Breathing and Coronary Circulation

SIR,—Dr. R. H. Dixon (Jan. 6, p. 27) will find breathing and the coronary circulation fully discussed in *Chronic Maladies*, a book by Dr. Todd of Bristol. Ten years ago, at 57, I found myself unable to walk even on the level without retrosternal pain and discomfort—an obvious candidate for coronary thrombosis. By following Dr. Todd's suggestions on breathing I can now climb almost any hill provided I do not go too fast. My chest expansion has increased from one inch to over three.

The coronary circulation depends on the efficiency of the pulmonary pump, and that on thoracic movement. Not for nothing is coronary thrombosis termed the "surgeon's disease." Half his working day the surgeon spends standing in a vitiated atmosphere, and "holding his breath" at that, and the rest in his car inhaling cigarettes; chest expansion, half an inch!—I am, etc.,

"F.R.C.S."

"Clausen's Harness": A Disclaimer

SIR,—Occasional references in your columns and elsewhere to "Clausen's harness" prompt me to point out that, though some years ago I did describe a mask-retaining apparatus, I can hardly claim authorship of the article as now sold. The flat "lifeless" rubber, the fabric inserts which destroy elasticity in the straps, the widely spaced holes which make adjustment difficult, the sharply recurved hooks which hinder application and removal—these are "improvements" for which I claim no credit.

In view of the inventive proclivities of anaesthetists it is perhaps surprising, as well as gratifying, that the article has survived so little changed—a proof of its usefulness if not of its perfection. But a protest against its too routine use may not be out of place, for it has its dangers. I would, in fact, like to emphasize the point made to me not long ago by a teacher of anaesthetics, that the student and the beginner should not be permitted to use any harness until they have mastered the art of holding the mask and the jaw by hand.

"Débridement" is hardly my affair, but words and their usage interest me. My *Larousse* tells me that the word means the act of removing the bridle from a horse, but if surgeons choose to use it with quite another meaning that is their affair, and does no harm so long as the implied meaning is agreed by all. "Tourniquet" may be such another adopted word, for *Larousse* gives many meanings for it in French, none of which has any surgical implications.—I am, etc.,

London, N.W.8. R. J. CLAUSEN.

The Future of the G.P. Surgeon

SIR,—May I be spared a little space to ventilate a point which is exercising many G.P. surgeons at present. In the spate of correspondence in the *Journal* since the Questionary I have not seen any discussion of the future of the G.P. who at present does surgery in cottage hospitals. It would appear that a doctor must in future be either a physician only or a surgeon of consultant standard. There must be many men who, by reason of long experience, have been acknowledged as surgeons, and many who, having a surgical degree, enter general practice with the justified intention of doing their own surgery. In a future extension of the hospitals it would surely be reasonable that these men could be used to great advantage, if only as juniors to consultants. No reasonable man would give them *carte blanche* in every field of surgery, but there is a definite place in which they would be quite at home. By reason of the close contact of G.P., patient, and local hospital the results of G.P. surgery compare very well with those of major hospitals in both "cold" and emergency operations. The latter in particular benefit by the time factor alone.

In this, as in many of the discussions of late, we feel very much in the dark, and any views or light on the subject would be appreciated. It is inconceivable that the large number of men who have spent time and money to cultivate an interest and degree of surgical skill should have to abandon their "specialty" and revert to the non-operating doctor role.—I am, etc.,

Crewe. J. K. B. WADDINGTON.

The Younger Men

SIR,—It is instructive to read two letters in the *Journal* of Jan. 6 (p. 28). "B.1," who is able to continue his studies during the most receptive period of life and enter for the higher examinations, asks for further economic and marital amenities. "Serving Officer," who may have been allowed six or at most twelve months' resident hospital appointments, has had no such opportunities, nor has he an equal chance to state his case. Under these circumstances the E.M.S. man has an enormous pull over his colleague on active service, and a far greater opportunity of entering the consultant or specialist ranks.

Observation of more than thirty hospital residents who have worked under me during the last six years has not made it apparent that those who enlisted were less promising material than those who obtained further deferment. This is unlikely to be an isolated experience. In common fairness a doctor who has suffered the hardships of active war service is entitled to at least as good a chance as his contemporary who has enjoyed less rigorous work. The assurance that young serving officers would be replaced by E.M.S. men at the earliest opportunity would relieve the discontent so many of the former feel. Both the future of medicine and eugenic considerations suggest the need for such a step.—I am, etc.,

New Milton, Hants. A. BASIL ROOKE.

Demobilization and the E.M.S.

SIR,—While sympathizing with many of the points raised in the letter by Majors Armstrong and Maddocks (Dec. 30, p. 869) I feel that they were unduly biased in their inability to "see one single reason why civil service should count."

The majority of us in the E.M.S. have been directed and kept there by the same controlling body which is also responsible for supplying the medical personnel of the armed Forces—the Central Medical War Committee. In my own case, on volunteering for the Navy at the outbreak of war I was turned down, being "too old at 35." Hoping to become more useful and to ensure some clinical work when the inevitable call-up came, I acquired a diploma in anaesthetics, and again volunteered. This time I was told that no more anaesthetists were needed because of the comparatively few casualties at that time, and was strongly advised to join the E.M.S. For three and a half years I have worked whole-time in the same hospital. Undoubtedly I should have been replaced if the Central Medical War Committee had thought

that my services could have been more useful elsewhere, or if the work could have been undertaken by someone not physically fit. Meanwhile my home has been blitzed, and my practice—representing ten years' hard work—has all but vanished. Wartime sacrifices have not been limited to the armed Forces.

It seems unlikely that the majority of Service M.O.s have spent more than a small proportion of their time in "sitting beside a slit trench" (H. Holden, Nov. 4, p. 610). I remember being visited by an R.N.V.R. friend in the summer of 1941, who, after two years in an armed merchant cruiser, had seen neither enemy submarine nor aeroplane, nor had heard gunfire. On only two nights of that period had he failed to sleep in pyjamas. In those dimly remembered days London was considered "front-line."

The points mentioned by Majors Armstrong and Maddocks are very real disadvantages of Service medicine, but they seem insufficient to justify a conclusion that the work of the rest of us counts for nothing at all. Moreover, Service medicine has some small compensations—rank, variety of experience, travel, popular prestige, and the promised gratuity. Much of the bitterness of these letters might have been avoided if at the outbreak of war we had become a single national medical service, to attend to all, irrespective of uniform or the lack of it.—I am, etc.,

London. "E.M.S."

Death of Robert Burns

SIR,—It was high time that some member of the medical profession made a determined effort to explode the legend that Robert Burns died of drink and dissipation. It is doubtful, however, if Dr. S. Watson Smith has given us the true picture yet. If Mrs. Carswell's facts, as given in her well-documented life of Burns, are correct, it was neither drink nor infective endocarditis which killed the unfortunate poet, but his doctors.

It appears that after many months of joint pains, increasing weakness, and emaciation, Burns was ordered by his physician, Dr. Maxwell, to go to country quarters "and there indulge in sea-bathing, horse exercise, glasses of port wine, and iron water. He was already being heavily dosed with mercury" (p. 443). On June 16, though scarcely able to stand, he went by himself to lodge in a wretched village on the Solway. "Each day he waded shakily—he had to wade a long way to get the required depth—into the chill Atlantic water that he might stand obediently up to his armpits till it was time to drag his aching joints out again and slowly dry himself and sip his allowance of port. Riding was beyond him even if he could have hired a horse, and he had no money." The wonder is that he survived this treatment until July 18, when financial worries drove him home. He arrived in such a feeble, fever-stricken state that he could not climb the stairs to his bedroom, and he collapsed on the kitchen "box-bed," where he breathed his last two days later. But for alcohol he might have died sooner.

Even the lack of the stethoscope and the clinical thermometer hardly explains why Burns fared so ill at the hands of our profession. I am glad to see Dr. Watson Smith making the *amende honorable*.—I am, etc.,

London, S.W.3. LETITIA FAIRFIELD.

Medical Reciprocity

SIR,—Dr. James Burnet's letter on medical reciprocity with France (Jan. 6, p. 27) raises a much wider question on this subject. While expressing no opinion on Dr. Burnet's proposal, I consider that the whole question of reciprocity might be reconsidered in the light of present-day conditions. The English qualification, for example, is not generally accepted in at least one of our Dominions—Canada. Some Provinces accept it, others do not. Surely there should be reciprocity between this country and her Colonies and Dominions before permitting such a state between this country and foreigners.—I am, etc.,

London, N.22. S. CHAPLIN.

"Healthy Industry"

SIR,—It is difficult to understand how the reviewer of my book *Healthy Industry* (Dec. 30, p. 855) could have overlooked or misunderstood that it was written for managements interested in industrial health services. Obviously it was never intended as a discourse for medical men on industrial medical conditions in a factory, hence the omission of medical data redundant to a management of laymen. The annual report so adversely criticized is at least a factual record of work done and results achieved. If, however, the reviewer or any other industrial medical officers with practical experience of this type of work could enhance this report their contribution would be warmly welcomed, not only by myself but by all those engaged in similar work, and incidentally the purpose of this letter will have been achieved.—I am, etc.,

Liverpool. JACK TARSH, M.B., CH.B.

The Services

Acting Squad. Ldrs. S. Davidson and E. A. G. Goldie, R.A.F.V.R., have been awarded the Air Force Cross.

The following Air Force medical officers have been mentioned in dispatches: Air Vice-Marshal F. C. Cowtan, C.B., K.H.S.; Acting Air Cdre. F. J. Murphy; Gp. Capts. J. D. Leahy, M.C., R. H. Stanbridge; Acting Gp. Capts. R. G. James, A. F. Cook, R. L. C. Fisher, F. E. Lipscomb; Wing Cmdrs. F. G. Mundell and R. Thorpe; Acting Wing Cmdrs. J. G. L. Brown, H. A. Graham, J. G. Stewart, J. L. Brown, J. F. MacCarthy, A. Muir, J. St. C. Polson, J. B. Ross, C. Wollaston, J. R. Cellars, D. J. Dawson; Squad. Ldrs. K. G. Bergin, P. M. Davies, J. H. P. Gauvain (deceased), L. D. A. Hussey, J. M. Kerr, M. L. Maley, A. T. M. Roberts, D. Skinner, W. H. C. Spooner, D. M. Wallace, O.B.E.; Acting Squad Ldrs. C. Bucknall, J. G. Burgess, R. H. Carpenter, G. Clayton, C. V. Gledhill, J. Guthrie, T. A. Hale-Monro, D. W. Higson, W. L. James, A. D. Messent, E. J. G. Murray, T. H. Redfern, C. O. Ribeiro, D. C. Russell, O. Scarborough, W. B. Waterfall; Fl. Lieuts. D. Laing, W. J. Lynd, W. R. K. M. Parry, F. S. Rickards, J. E. Sharpley, A. Standeven, P. W. G. Sutton, L. A. Sylvester, J. Taylor, R. G. M. Wedderburn, J. H. Wilkins, J. A. J. Wiseman, A. C. Smerdon; Flying Officer H. T. Foot.

CASUALTIES IN THE MEDICAL SERVICES

Killed by enemy action.—Major William Napier, R.A.M.C.

Died in hospital in India.—Capt. Frank Alec Stuart Austen, R.A.M.C.

Wounded.—War Subs. Capts. K. M. Bell, A. Lyell, D. J. Tibbs, J. P. Weiss, R.A.M.C.

Prisoner of war.—Brig. C. H. Stringer, D.S.O., O.B.E.

Universities and Colleges

UNIVERSITY OF LONDON

The following candidates have been approved at the examination indicated:

ACADEMIC POSTGRADUATE DIPLOMA IN MEDICAL RADIOLOGY.—P. C. Bhandari, A. S. Craner, F. Duval, N. Hajdu, A. L. Henderson, H. B. McDowell, J. Noriega, A. P. S. Sanders, A. A. Vickers, J. G. Winternitz.

UNIVERSITY OF DURHAM

At a congregation held on Dec. 22, 1944, the following medical degrees were conferred:

M.D.—[1] Helen Ramsay.

M.S.—E. J. Field, R. A. Fleming, [1] J. Swinney, [1] H. K. Vernon.

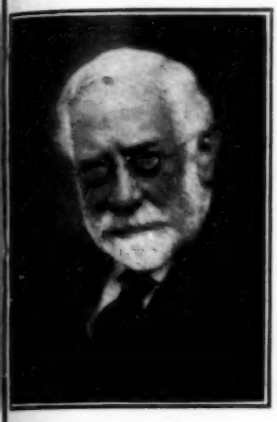
M.B., B.S.—W. R. Argument, Marjorie Bell, A. Bender, R. E. Blaker, A. McK. Brass, Doreen C. Brown, Elspeth M. C. Brown, N. Cardoe, R. G. Chaytor, Joan C. Dickinson, W. H. B. Ellis, A. J. A. Ferguson, A. C. Fleming, F. W. Fordyce, Mary M. Harrison, J. D. Irving, W. Jack, Kathleen D. Knox, Muriel M. Lingwood, J. L. McConchie, Norah Martin, P. Millyard, R. W. J. Naismith, E. M. Norman, G. E. Paget, R. M. S. Parker, A. Pearson, K. Pickworth, W. G. A. Riddle, R. K. Rowntree, Winifred H. Russell, Jane C. Salkeld, R. G. H. Salkeld, Viola E. Shafto, N. A. Sharples, S. G. Siddle, E. Silver, J. E. Stobbs, W. E. Stuart, Elizabeth Troupe, Doreen M. Watson, J. P. Wedderburn, G. E. Welch, J. T. Wheldon, Jean G. Wight, Mary C. Winters, N. E. Wood, N. A. Wynne, J. H. Batchellor.

[1] In absentia.

Obituary

SIR THOMAS BARLOW, Bt., K.C.V.O.
M.D., F.R.S., F.R.C.P.

The doyen of the medical profession died in London on Jan. 12, full of years and honours. Thomas Barlow, the son of James Barlow of Edgworth, Lancashire, a manufacturer in the cotton trade, was born on Sept. 4, 1845. He entered Owens College, Manchester, and remained until 1867, when he took the degree B.Sc.Lond. His career as an undergraduate was very successful: he gained prizes in zoology, geology, and botany, chemistry, physics, and mechanics; he also won the second prize for the Dalton Chemical Essay (1866), and the Dalton Natural History prize. In 1868 he joined the medical school of University College, London, where he continued his successful career, becoming in due time physician assistant to Sir William Jenner and also house-surgeon and obstetric assistant. He took the M.R.C.S. in 1871 and graduated M.B. Lond. in 1873, gaining first-class honours in medicine and honours in other subjects. The M.D. was passed in 1874, when he also began his long and varied experience as a member of the staff of important London hospitals. He was appointed registrar to the Hospital for Sick Children, Great Ormond Street, and in the following year became assistant physician to it, and was elected physician ten years later; he retired to the consulting staff in 1899. In 1876 he was appointed assistant physician to Charing Cross Hospital, but in 1878 he gave up this post for a similar one at the London Hospital. In 1880 his old teachers showed their opinion of his abilities by inviting him to return to University College Hospital as assistant physician. In 1884 he joined the staff of the London Fever Hospital, but retired after four years' service. He was professor of clinical medicine at University College from 1895 to 1907 and was elected professor emeritus in 1911. He retired from the active staff of U.C.H. in 1910.



Barlow's house-physicians and the senior students who attached themselves to him learnt much and realized the immense fund of clinical knowledge stored in his retentive memory. He was in truth a remarkable example of the results that may be obtained in clinical medicine by the method of observation applied in a critical scientific spirit. He would spend an immense amount of time and care on any case which presented a novel combination of symptoms, suggested a new line of inquiry, or the solution of an old problem. Often he would sit lost in thought at the bedside until students grew impatient; but the features of the case were being indelibly fixed in his mind, and the reveries would be ended by a question which sent the clinical clerk home to reflect on the advantages of not being in a hurry. There is little exaggeration in the use of the word "indelibly," for he had the power of recalling for illustration or comparison details of cases he had seen many years earlier. He loved an argumentative conversation on any one of the many clinical subjects in which he was interested; ready to weigh the opinion of others he was tenacious of his own, though prepared to reserve judgment when he felt that more facts were needed. While stress is justly laid on his deep personal interest in clinical medicine, it would be wholly incorrect to give the impression that he was indifferent to experimental medicine or in the least disposed to belittle its results.

Barlow's Contributions to Medicine

His own contributions to medical literature, all founded on clinical observation, were numerous and important. Early in his career he published some valuable work on meningitis. In a paper written with Samuel Gee on cervical opisthotonos in infants (*St. Bartholomew's Hospital Reports*, 1878) simple or basic meningitis (now known as meningococcal meningitis) was differentiated from tuberculous meningitis. Through this work non-tuberculous meningitis was afterwards recognized clinically, but it was not until 1897 that Carr (*Med.-Chir. Trans. Lond.*, **80**), in a paper on "Non-tuberculous Posterior Basic Meningitis in Infants," showed that it should be regarded as a distinct form of meningitis and separate from other forms of the disease secondary to ear diseases and other local infection. Next year Stile isolated the micro-organism and showed that it was practically the same as that isolated by Weichselbaum in the epidemic form of the disease. With D. B. Lees, Barlow wrote the article on simple (posterior basic) meningitis in the first edition of Allbutt's *System of Medicine* (1899); it was founded on clinical and pathological observation of 110 cases. In this article, full of valuable statistics and observations and illustrations, Barlow and Lees differentiated posterior basic meningitis from the vertical type—a distinction not adopted by Batten in the article on meningitis (all forms except the tuberculous) in the second edition of the *System*. Rickets was another disease closely studied by Barlow with his observing mind. He was the first to point out that the sharp drawing of the forefinger over the skin in front of the ear, where the facial nerve emerges, in a child suffering from tetany causes contraction of the muscles of the face. With Lees he inquired into the relationship of congenital syphilis and rickets, and found that in 47% of cases in which craniotabes (thinning of the flat bones of the skull, with bosses on the frontal and occipital bones) occurred in rickets there was a certain history of syphilis. A very important paper was contributed jointly with Warner to the *Transactions* of the International Congress of Medicine, 1881, on the subcutaneous tendinous nodules met with in the acute rheumatism of childhood. The condition had been seen by previous observers, but Barlow and Warner were the first to point out its comparative frequency and clinical significance. Later experience has confirmed the view expressed by these observers, that the nodules indicate concurrent and usually progressive cardiac disease; that a similar process of inflammatory change and proliferation is going on in the fibrous tissues of the cardiac valves or pericardium, or in both; that they indicate grave danger, and a carditis which is uncontrollable and advances almost invariably to a fatal ending. Barlow wrote a paper for this *Journal* (1883, **2**, 511) recording the post-mortem appearances in five cases in which the nodules were present. He came to the opinion that the nodules correspond with the inflammatory exudation which forms the base of the endocardial vegetations in the top of which later on a cap of fibrin may or may not be deposited. In this same paper he stated that he had never been able to assure himself of the production of cardiac murmurs in erythema nodosum, nor of any intercurrent arthritis, however slight. He thought the pains of the disease could be accounted for by effusion into the skin. He held that more evidence was wanted before saying that erythema nodosum was clearly related to rheumatism, much less identical with it, though in some respects it was parallel with it.

In 1883 and 1885 Barlow reported to the Clinical Society of London some observations on Raynaud's disease in which he noted a point that acute observers had overlooked. It was the parallelism between cases of intermittent haemoglobinuria and characteristic cases of Raynaud's disease—those, that is to say, in which the local asphyxia is paroxysmal with a return to the normal state between the attacks. Barlow suggested that possibly other visceral paroxysmal affections might be found, in these cases, comparable with the temporary enlargement of the spleen sometimes found in haemoglobinuria. This suggestion he verified later in a case under his care. He made several other clinical observations on the disease which are to be found in his illuminating article on the subject in Allbutt's *System of Medicine*.

The original work by which Thomas Barlow will probably be best remembered is that connected with infantile scurvy or scurvy rickets. Isolated cases have been recorded as far back as 1651, when in his treatise on rickets Glisson described a complication. German clinicians of last century also recorded cases which they, however, looked upon as examples of acute rickets. The first suggestion of the real nature of the disease,

was made in 1873 by a Swedish physician, Ingerslev. The first case in England was reported by Sir Thomas Smith in the *Pathological Transactions* (1876), but he called it a case of haemorrhagic periosfitis and did not connect it with scurvy. It remained for W. B. Cheadle to describe the disease as true scurvy and trace it to the want of antiscorbutic element in the food. This he did in 1878 in a clinical lecture based on three cases. In later years Cheadle recorded more cases and other clinicians added to the list. Barlow then became interested in the subject and in 1883 published the result of his observations in the *Transactions of the Medico-Chirurgical Society*, recording 31 cases, several of which he had seen in his own practice, and giving an exhaustive account of the pathological changes in three cases. This paper is looked upon as completing the investigation of the disease and adding the final proof that the lesions found in it are identical with those met with in the so-called sea or true scurvy of adults. He returned to the subject in his Bradshaw Lecture before the Royal College of Physicians in 1894, when he brought evidence gleaned from later experience to support his original description. This work greatly impressed German scientists, who declared their appreciation of it by calling the disease after him—"die Barlow'sche Krankheit." The important effect which the discovery of the real cause had on infant feeding at a time when artificial foods and sterilized milk were becoming very popular cannot easily be exaggerated; but Barlow spoke with great caution because he was fully alive to the urgent and great risks that might attend the use of unsterilized milk. Half a century later, in 1935, when he reached the age of 90, the *Archives of Disease in Childhood* made its August issue a special tribute to the importance of his work on infantile scurvy. It reprinted his original paper from the *Medical Chirurgical Transactions* (1883, **66**, 159), "On Cases described as 'Acute Rickets' which are probably a Combination of Scurvy and Rickets, the Scurvy being an Essential and the Rickets a Variable Element." In a contribution to the birthday number Sir Frederic Still showed that thanks to it the disease became recognized much earlier and feeding corrected so that children were spared months of suffering and many lives saved. Thus of 35 cases recorded by Barlow, 20 were over 1 year old and approximately 1 in 4.5 had died; whereas of the 155 seen by Still the majority were between the ages of 6 and 12 months and the mortality almost exactly 1 in 18. As further homage to Barlow were other writings by American and Continental physicians on the very early recognition of infantile scurvy by radiological examination; latent scurvy; scorbutic dystrophy; and the identification of vitamin C of the citrus fruits so much used in prevention of the disease.

In a foreword to the birthday tribute in 1935 Lord Horder described it as a collection of essays written in honour of a man who was so easily and so notably the doyen of British medicine. " . . . Though it is many years since his colleagues have been deprived of that wealth of experience, sound judgment, and cheery helpfulness they invariably got from him, he has retained an active interest in many affairs that have as their object human betterment in general and the welfare of the medical profession in particular. He has continued until now to infuse vitality into every institution and movement in which he has taken a part." "But of Barlow it might be said more truly than of any of his contemporaries that he is of no one school, but of all . . . he has been too great to be parochialized." A visit that afforded him and his Lancashire friends much pleasure was paid in his ninetieth year to take part in the celebration of the centenary of the Manchester Medical Society, of which he had been an honorary member for many years.

Sir Thomas Barlow became a Fellow of the Royal College of Physicians of London in 1880, and has long headed the list. He was Censor in 1905 and 1906, and was elected President in 1910; he was re-elected four times. The medical events during his tenure of the office were two. One was the introduction of the National Insurance Act and the controversy to which it gave rise. Barlow never declared his own opinion very clearly, but probably he was in favour of the principle the Act embodied. The second was the International Medical Congress held in London in 1913, over which he presided. In 1916 he gave the Harveian Oration on "Harvey: the Man and the Physician." He was Physician Extraordinary to Queen Victoria and was in attendance during her last illness; he was continued in the same office by King Edward VII and King George V. He was created a baronet in 1900 and K.C.V.O. in the following year. He was elected F.R.S. in 1909, and at various times received honorary degrees from the Universities of Aberdeen, St. Andrews, Edinburgh, Durham, Harvard, Montreal, Toronto, Christiania, Dublin, and the Victoria University of Manchester.

Barlow joined the B.M.A. as long ago as 1873. He served as secretary of the Section of Medicine in 1884, was vice-president of the same Section in 1891, and its president in 1906. He was also president of the Section of Diseases of Children in 1893, and in 1902 he gave the Address in Medicine before the Annual Meeting of the B.M.A. at Manchester. In 1918 he was elected an honorary member of the Société Médicale des Hôpitaux de Paris. He was awarded the gold medal of the Royal Society of Medicine in 1932, receiving it in person, at the age of 87, at the annual dinner of the Society.

Personal Traits

He was a fine specimen of a Lancashire man. Short and sturdy in build, his features bore the stamp of robust common sense with which he was richly endowed. Combining shrewdness in thought, directness in action, and openness in speech with a wide and thorough knowledge of clinical medicine he attained the highest position in London as a consultant, and no London physician was more highly thought of by his fellow practitioners in the county of his birth; many a time and oft were cases sent to him by them for his opinion: they knew that they would get practical and valuable advice from him. Home visits to the village where his brother's mills were afforded him great pleasure, for he had a deep affection for his own people, among whom he liked to be. His success as a physician was due in great part to his personality; his kindliness of heart, his sympathetic nature won the confidence and trust of patients, young and old, and of the anxious relatives. His attitude to patients has been well described by the poet-physician Robert Bridges in his *Recollections*; there is also an excellent and rather moving account of him as clinical teacher at Great Ormond Street in *Behind the Night Bell* (1938) by the late Dr. F. G. Layton: "He had a sort of intuitive flair for diagnosis. He had more than that. He had the knack of saying always the kind thing. The old Queen did well when she chose him as one of her advisers. He was very blunt; he was very rugged—he came from the North Country; he was fundamentally honest. It is forty years since I last spoke to him, but I love him to-day as I loved him forty years ago. I still feel that I owe him more than I can ever repay. He more than anybody else taught me the merits of humanism as applied to medicine; and he did it not by any deliberately spoken word but by just being himself."

After his retirement, and up to the last, Sir Thomas Barlow remained a still active figure in the eyes of the profession through his whole-hearted work as president of the Royal Medical Benevolent Fund since 1920. Himself a generous supporter of the charity, he wrote letters to the medical journals every year asking for contributions to its Christmas Gift Fund. He married in 1880 the daughter of Patrick Dalmahoy of Edinburgh, and leaves two sons and a daughter. His eldest son, Sir Alan Barlow, entered the Civil Service and is Second Secretary to the Treasury. His second son, Sir T. D. Barlow, carried on the family business in Manchester and Bolton, and is now Director-General of Civilian Clothing at the Board of Trade. A third son died on active service in the last war. During the long evening of his days Sir Thomas was tended with unwearying care by his daughter Helen.

WALTER ESSEX WYNTER, M.D., F.R.C.P.

On Jan. 4 the death took place at Newbury of Walter Essex Wynter, aged 84, consulting physician to the Middlesex Hospital, where he was over a long period of years both beloved and respected by many generations of students and house-physicians. He was the son of Andrew Wynter, M.D., editor of the *British Medical Journal* 1855–61, was born in 1860, and was educated at Epsom College, on the council of which he afterwards served for many years, and at Middlesex and St. Bartholomew's Hospitals. He qualified as M.R.C.S. in 1883 and became

F.R.C.S. in 1885, but he gave up surgery in favour of medicine, took the M.B.Lond. (with honours) in 1887, the M.D. in 1888, and became F.R.C.P. in 1897. Elected to the staff at Middlesex he soon established a high reputation not merely as a physician but as a very fine teacher; and this at a time when Middlesex had several other remarkable personalities on the teaching staff (e.g., Bland-Sutton). He published two books in his early days—*A Manual of Clinical and Practical Pathology* in 1890, and *Minor Medicine* in 1891.

Wynter had a strongly built sturdy frame, with a rubicund and cheerful countenance, and was a man of boundless energy. As the *Times* has indicated, he was independent of private practice, but worked hard in his wards and in his teaching rounds from pure enthusiasm. When he retired from London, a good many years ago, he discovered on the edge of Newbury (and almost next door to the district hospital there) a semi-derelict manor house, whose ground floor was being used as a store for builders' ladders, wheelbarrows, and other stock-in-trade. This he bought and very lovingly restored: upstairs is some of the oak timber of the original building (of 1330), downstairs a charming room with herring-bone red brick work and oak panelling dating from 1550—he used to speak of this as the "modern improvements" then undertaken. This treasure—Bartholomew Manor—with a beautiful old-world garden, he was never tired of displaying to any visitors. Within the same curtilage stands another very ancient building, which Wynter converted into a hostel for retired nurses; of this a full account was given in the *Journal* of Feb. 19, 1938. It is understood that he has provided an endowment fund, to be administered by the Middlesex Hospital, to keep in being this splendid work of practical (and much-needed) philanthropy. Another of his interests, as has been mentioned, was his old school, Epsom College. After the last war his brother, the late Dr. Andrew Wynter, handed his war gratuity to the college to accumulate at compound interest until it should be sufficient to found a scholarship; to this gift Walter added very considerably, and the fund now stands at just about the goal the two brothers had in view—namely, £1,000. At Newbury Walter Wynter was of great value as physician to the district hospital; he also served for several years on the town council and rendered immense service as chairman of the public health committee. When about 70 years of age he was advised to submit to amputation of one leg above the knee; naturally his friends began to entertain forebodings for him, but he "never turned a hair" after the operation, and soon became as active and energetic as ever. He was of a most amiable and cheerful disposition; a correspondent says rightly that he can hardly have had a single enemy. He married Ada Margaret, daughter of Samuel Wills of Bristol; they had no children, and Mrs. Wynter died in 1937.

Surg. Rear-Adml. GORDON GORDON-TAYLOR writes:

May I offer a tribute to the extraordinary charm of Walter Essex Wynter and to his surgical "angle." Wynter's interest in surgery remained throughout his professional career; he taught for some years along with Bland-Sutton in the anatomical department of Middlesex Hospital. Destined himself to the practice of medicine, he rarely missed an occasion to attend the operating theatre when any case from his medical wards was being operated on, and fortune happily seemed to ordain that during most of the years of his service at Middlesex his "corresponding" surgeon was his friend Sir John Bland-Sutton, whom he ardently admired. Although a physician, he performed for the first time the operation of lumbar puncture, and he often ventured to suggest ingenious methods for dealing with commonplace maladies: in the period which preceded the era of liver therapy for pernicious anaemia many a spleen was removed at Wynter's suggestion by Bland-Sutton and the writer, with results which contrasted favourably with those of medical therapy in the treatment of the disease at that time. He had bizarre notions for getting rid of abdominal ascites without the systemic loss of fluid which attends recurrent tapping, and for a period of time "crural drainage" was a fashionable method of treatment for this condition in his wards. He had a passion for exploring new therapeutic preparations; many were soon discarded, but the writer recalls a more prolonged trial of a preparation—tinctura apocyani, which he termed the "vegetable trocar"—in cases of ascites. Wynter will long be remembered by his contemporaries and pupils for his unvarying kindness and charm; he had a most lovable nature and could not have had an enemy in the world. He is said to have grown his own tobacco in his garden at Newbury and to have smoked it green; some have alleged that this practice may have had some share in the malady from which he suffered for the last 15 years of his life. He endured much pain and surgical mutilation; but his affliction he bore with his customary fortitude, equanimity, and cheerfulness, even during the final period of his life, when the advance of crippling disease precluded him from wielding the rod and reel of the craft of which he was so devoted and skilful an exponent.

JOSEPH GRIFFITHS, C.M.G., M.D.Ed., M.Ch.Camb., F.R.C.S.

The death of Dr. Joseph Griffiths on Jan. 3 at Cambridge removes the surgical doyen of that town, where he had practised with conspicuous success during almost the whole of his long professional career. He was 81 at the time of his death, and qualified as M.B.Ed. in 1885, almost 60 years ago; he took the D.P.H. (of Cambridge) in 1887, M.D. in 1890, F.R.C.S. in 1892, and M.A., M.Ch. in 1907. After the death of Sir George Humphry in the middle 'nineties the professorship of surgery at Cambridge remained vacant for several years until the appointment of Howard Marsh; during part of this time the teaching of the subject was in the hands of Joseph Griffiths, who was reader in surgery from 1897 to 1902. He was then quite a young surgeon, though with an already established reputation as a careful and reliable exponent of his specialty. Widely known and liked as "Joe," he was of great value to Addenbrooke's at a time when that hospital was rather short of capable surgeons—a deficiency supplied later when Roderick, Cooke, and others started practice in the town. Griffiths was a tiny little man physically, but of abounding energy and enthusiasm. During the 1914–18 war he was O.C. the 1st Eastern General Hospital, with the rank of colonel, and was awarded the C.M.G. for his services. He had also been surgeon to the St. Leonard's Hospital, Sudbury; and was Hunterian Professor at the Royal College of Surgeons in 1894 and 1895.

A Cambridge colleague writes:

Griffiths added a large number of pathological specimens to the Museum, especially bone preparations, having evolved, with the help of his laboratory assistant, Frederick Izzard, a method of maceration which produced beautifully white specimens of bone diseases which were the constant admiration of generations of surgical examiners. He also had a large private collection which he presented to the Royal College of Surgeons. At the time of his death Griffiths was senior consulting surgeon to Addenbrooke's Hospital, having served on the honorary staff since 1892; he was also consulting surgeon to the Huntingdon County Hospital. In the last war he was in command of the 1st Eastern General Hospital, which was located in Cambridge. It was mobilized on Aug. 5, 1914, at the Leys School; it subsequently moved to Neville's Court, Trinity College, and finally to an open-air hutted hospital built on the King's and Clare cricket ground. The open-air ward was Col. Griffiths's own idea, and was thought by many to be too spartan, but it proved of undoubted benefit to the patients, and the advantage was brought home to those in attendance when a convoy of wounded Belgians arrived from France with very foul wounds. A farmer's son born in Carmarthenshire, he took up farming as a hobby, and in earlier years followed the hounds. He was a keen horseman, and also took a warm interest in animal pathology. He was honorary secretary of the Cambridge Medical Society, 1889–96, vice-president 1897–1900, and president 1901.

T. N. KELYNACK, M.D.

Mr. HUGH REID, F.R.C.S., of Liverpool, sends the following appreciation:

Nearly twenty years ago I met Dr. Kelynack for the first time. I had come back from a holiday in Switzerland and the talk naturally turned on mountains and snow and sunshine. I soon learned that his wide knowledge of people and places and particularly of sick children had taken him out to Montana and other centres to see for himself the conditions of sanatorium life. This ubiquitousness was characteristic of the man. If we talked of Derby or Liverpool or Edinburgh, Dr. Kelynack had been there; he knew the clinics, or the M.O.H., or a friend, or he had given a lecture or attended a hospital. His friendliness, his sympathetic interest, his warm and cheerful welcome at this first interview made me instantly and comfortably at home in his house. Young people of all ages took to him at once. His knowledge touched their interests and drew them out however shy they might have been—drew them out to discuss not only medicine but the philosophy of life and living.

My respect and admiration soon ripened into an affectionate friendship as I learned to know him better. His whole home radiated an air of joyous and purposeful living complemented by the influence of his brilliant doctor wife and his medical-student

daughter, afterwards destined to become Assistant Secretary to the B.M.A. One interesting incident stands out in my memory of Mrs. Kelynack's practical efficiency. I had come down from Liverpool to stay at Harpenden, and one evening went off to London to one of the hotels for a dance, intending to go back to Liverpool the following morning. Towards midnight a telephone message came to Harpenden from a doctor in Southport asking me to perform an urgent operation. I had not thought of informing my host and hostess as to my whereabouts, but, nothing daunted, Mrs. Kelynack rang up a number of hotels in London, giving my description. Before 12.30 a waiter walked up to the table where I was sitting, asked me if I were the person described, gave me the message, which enabled me to spring into a taxi to catch the 12.40 from Euston. Mrs. Kelynack knew the value of time should an emergency arise. Her own activities fitted in with her husband's more leisurely outlook on life. It is easy to see how he came to lean on her guidance and care. One sometimes hears that an ideally happy marriage is somewhat of a rarity, but to stay with them was to see the working out of such a state in real life. His knowledge of the minds of little children with whom he was so intimately associated seemed to contribute to his directness and simplicity of outlook.

His latter years were clouded by the loss of his wife. He lost his resilience and his mainspring for existence. Now he lies buried in the grounds of the Children's Home in Harpenden side by side with the one whom he loved so well. The obituary notice in the *Times* gives an account of his academic distinctions, his wide activities, and the mark he made in his professional life. We who are left remember also his urbane and joyous personality, ready to encourage, ready to help, and ready to inspire.

Dr. ROBERT MUSCHAMP, one-time M.O.H. for Guiseley and Yeadon, a former chairman and member for about 20 years of Guiseley Urban Council, and for 12 years a member of the West Riding County Council, died in retirement on Jan. 4, aged 79. He studied medicine at Leeds, qualified in 1892, and was a Fellow of the Society of Medical Officers of Health. He is survived by his widow, a son, Dr. A. Muschamp, and two daughters, Dr. May Muschamp and Dr. Evelyn Muschamp, all three of whom are in practice in Guiseley and Yeadon.

Dr. JAMES RICHARD WHITWELL, formerly medical superintendent of St. Audry's Hospital, Melton, Suffolk, died suddenly on Jan. 9 in London, aged 81. The son of a medical man he was educated at Shrewsbury School and Edinburgh University, where he graduated M.B., C.M. with honours in 1887, and later studied in Berlin and Vienna. Before his appointment to St. Audry's he had been pathologist to the West Riding Mental Hospital, Sheffield, and assistant medical officer at Menston, Leeds. For many years he was honorary librarian of the Royal Medico-Psychological Association and a member of council of the Mental After-care Association and the Lebanon Hospital, Syria. Dr. Whitwell joined the B.M.A. in 1890, was secretary of the Section of Psychology at the Annual Meeting of 1900, and president of the Suffolk Branch in 1923–4. He gave the first description of the microscopical changes in the central nervous system in myxoedema in these columns on Feb. 27, 1892 (p. 430), and was the author of *Gleanings from Plato* (1935), *Historical Notes on Psychiatry* (1936), and *Syphilis in Earlier Days* (1940).

Although it is 25 years since Dr. JAMES DUNLOP retired from active practice, he is still well remembered in Essex, especially Aveley and Upminster, where he practised for many years. James Dunlop was born at Biggar, Lanarkshire, in 1862. He took the degree of M.A. in 1882 and the M.B., C.M. Glasgow in 1885, and then practised in Aveley and Upminster until 1920. During the 1914–18 war he had sole charge of 49th Wing, R.A.F., at Upminster, near Hornchurch Aerodrome. In 1921 he sustained a fracture of the odontoid process from a railway accident and retired to live in London. A colleague writes: He was a great man, a wonderful father and companion; very witty and of a happy disposition and so modest. He was very fond of sport and spent most of his spare time in the summer at Lord's Cricket Ground, becoming a member of Middlesex Club. He married Margaret Crawford Vallance and leaves three daughters. He died on Dec. 10, 1944, at the age of 82.

The following well-known medical men have died abroad: Dr. VICENTE BATISTA, paediatrician of Sao Paulo, Brazil, aged 48; Dr. HENRY KENNON DUNHAM, ex-president of the United States Association against Tuberculosis; Dr. JOAO DE CAMARGO, the Brazilian gynaecologist, aged 52; and Dr. LUIZ ANTONIO DA SILVA SANTOS, ex-dean of the faculty of medicine of Rio de Janeiro, aged 90.

Medical News

A meeting of the Medico-Legal Society will be held at 26, Portland Place, W., on Thursday, Jan. 25, at 4.45 p.m., when Mr. Hugh Linstead, M.P., will read a paper on "The Pharmacy and Medicines Act, 1941, and the Sale of Proprietary Medicines."

A conference to discuss the use of science in the post-war world, which is being organized by the Association of Scientific Workers, will be held at Caxton Hall, London, S.W., on Feb. 17 and 18. The object is to draw attention to the need for using science as fully in peacetime as in war. Further particulars may be obtained from the association at Hanover House, 73, High Holborn, W.C.1.

The gold medal for distinguished services in medicine of the New York Academy of Medicine has been presented to Dr. Oswald Avery, emeritus member of the Rockefeller Institute for Medical Research, in recognition of his investigations that "have led to discoveries and great advances in the science of bacteriology."

The seventy-fifth birthday of Vladimir Komarov, president of the Academy of Sciences of the U.S.S.R., and the fiftieth anniversary of his activities as a scientific worker were celebrated on Oct. 15, 1944.

A new Department of Physical Medicine and Rehabilitation to replace the one destroyed by bombing in 1940 was opened by Miss Florence Horsbrugh, Parliamentary Secretary to the Ministry of Health, at the Prince of Wales's General Hospital, Tottenham, on Dec. 20.

A meeting of the directors of the Society for Relief of Widows and Orphans of Medical Men was held on Jan. 3, with Dr. R. A. Young, president, in the chair. A legacy of £5,000 from Dr. C. Reid of Stafford was reported. At Christmas £1,100 was distributed as a present, each widow receiving £20. The half-yearly grants paid this month amounted to £1,948. Membership is open to any registered medical man who at the time of his election is residing within a twenty-mile radius of Charing Cross; full particulars may be obtained from the secretary. Election is by ballot and at the discretion of the Court of Directors. Members are reminded that their annual subscriptions are now due. The secretary attends at 11, Chandos Street, Cavendish Square, W., on Wednesdays from 4 to 5 p.m.

The medical committee of the Scientific Film Association has just published its first *Handlist of Films of Medical Interest*. This lists twelve recent films with a brief synopsis of their content and gives details of where to get them. Such lists, which it will publish at intervals, can be obtained from the honorary secretary. The committee also announces that it is now preparing a series of film programmes to be presented on the fourth Thursdays in February, March, April, and May at 5.30 and again at 8 p.m. A season ticket admitting to all four shows will be issued at a nominal charge of 3s. Application should be made immediately to the honorary secretary of the Medical Committee, Dr. S. J. Reynolds, 14, Hopton Road, S.W.16.

Dr. Dellepiane Rawson, an eminent plastic surgeon in the Argentine, has arrived in this country for a six-months visit arranged by the British Council. He is head of the special ward for plastic and restorative surgery at the Hospital Rawson, Buenos Aires, and associate teacher at the Faculty of Medicine, and will be working in the E.M.S. plastic surgery unit at Park Prewett Hospital, Basingstoke, with Sir Harold Gillies.

The 21st annual report of the Ella Sachs Plotz Foundation for the Advancement of Scientific Investigation records eighteen grants made during 1944 and gives a list of the investigators and the purposes of the research aided. Three workers in Great Britain received grants—Dr. N. Ambache, Guy's Hospital, for investigation of the action of tetanus toxin on synaptic junctions; Dr. P. Ellinger of the Lister Institute, for investigation into nicotinamide metabolism in various deficiency diseases; and Dr. A. H. T. Robb-Smith, of the Radcliffe Infirmary, Oxford, for an attempt to standardize haemoglobinometry. In making the awards the trustees favour researches that are directed towards solutions of problems of medicine and surgery or in branches of science bearing on medicine and surgery. As a general rule preference is given to researches on a single problem or on closely allied problems. Applications for the year 1945–6 must reach the secretary of the Executive Committee, Dr. Joseph C. Aub, Massachusetts General Hospital, Fruit Street, Boston 14, Massachusetts, before April next. Letters asking for aid must give the qualifications of the investigator, an accurate description of the research, the size of the grant requested, and the specific use of the money to be expended. It is highly desirable to include letters of recommendation from the directors of the department in which the work is to be done.

On Wednesday, Jan. 24, at 1.45 p.m. at the Royal Society of Arts, John Adam Street, London, W.C.2, a paper on forensic science will be read by J. B. Firth, D.Sc., F.R.I.C., M.I.Chem.E., director of the North-Western Forensic Science Laboratory. A sandwich lunch, which should be ordered in advance, will be served from 1 to 1.30 p.m. at 1s. 6d. per head. Invitation cards to the lecture may be obtained on request from the R.S.A.

Mr. W. S. Morrison, Minister of Town and Country Planning, will open on Feb. 1 in the Victoria Art Gallery, Bath, an exhibition of maps, drawings, and models of the proposed scheme for the reconstruction and replanning of Bath and the surrounding area. The scheme has been prepared for the Bath and District Joint Planning Committee by Sir Patrick Abercrombie in conjunction with the city engineer and the planning officer.

Prof. Pasteur Valery-Radot has been elected member of the Académie des Sciences and Dr. Georges Duhamel has been appointed permanent secretary.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* there were 437 more cases of measles than last week, and 97 more of acute pneumonia. Notifications of scarlet fever fell by 394, those for whooping-cough by 138, those for dysentery by 50, and those for diphtheria by 10. Lancashire reported 88 fewer cases of scarlet fever than last week, and Staffordshire 40; in Lancashire the total for whooping-cough fell by 38. Diphtheria notifications showed a drop of 11 in Northumberland. Notifications for this disease stand at about half the usual winter level. The local trends of measles fluctuated considerably: Middlesex reported a rise of 147, Derbyshire of 77, Yorks North Riding of 76, Durham of 74, Surrey of 68, and Kent of 60; in Lancashire and Cheshire the incidence dropped by 190 and 111 respectively. The 123 notifications of dysentery are the smallest weekly total recorded during the year, although in Essex the cases rose from 7 to 23. The only other large returns were those of Lancashire and London with respectively 24 and 16 cases.

In *Scotland* measles notifications rose by 132, and diphtheria by 19, but those for whooping-cough dropped by 64, and for dysentery by 32. Of the 101 cases of dysentery, 33 were reported in Lanark County and 29 in Glasgow.

In *Eire* there was a serious rise in diphtheria notifications—11 more cases than in the preceding week; 47 cases were notified in Dublin C.B., and the remaining 144 were spread over fifty-nine registration areas.

In *Northern Ireland* measles notifications fell from 248 to 118; all but 10 cases were reported from Belfast C.B.

The Health of Edinburgh

The provisional returns for 1944 show that the births, 7,907, were the highest for eighteen years, and the deaths, 5,995, were the lowest since 1938. The infant mortality was 51 per 1,000 births—the lowest on record; 12 deaths were attributed to diphtheria, the lowest total since immunization was first introduced twenty-two years ago. During this period only 7 deaths have occurred among immunized children, compared with 868 among non-immunized, and in the last seventeen years no deaths had occurred among the immunized children. Deaths from pulmonary tuberculosis numbered 254, and 49 from non-pulmonary, compared with an average for the preceding five years of 301 and 73.

Quarterly Returns for Northern Ireland

The birth rate during the September quarter was 22.8 per 1,000, being 1.0 below the rate for the third quarter of 1943 but 1.0 above the average of the third quarters of the five years 1939-43. Infant mortality was 56 per 1,000 registered births, the lowest rate recorded during the present war, and 12 below the average of the five preceding September quarters. Maternal mortality was 2.8 per 1,000 births—0.6 below the five-years average. The general death rate was 10.6 per 1,000—0.8 below the average. Deaths from the principal epidemic diseases were equivalent to a rate of 0.42, which is the lowest for over twelve years. Of the 139 deaths included under this heading, 90 were attributed to diarrhoea and enteritis, 23 to whooping-cough, and 11 to diphtheria. Deaths from pulmonary and non-pulmonary tuberculosis were 194 and 64, compared with 207 and 69 for the average of the five preceding third quarters.

Week Ending January 6

The returns of infectious diseases during the week in England and Wales included: scarlet fever 1,462, whooping-cough 538, diphtheria 439, measles 11,947, acute pneumonia 1,242, cerebrospinal fever 49, dysentery 204, paratyphoid 1, typhoid 8. Influenza deaths in the 126 great towns numbered 55.

No. 52

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Dec. 30.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each Infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1944 (a)	(b)	(c)	(d)	(e)	1943 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	38	6	24	1	1	73	7	30	7	4
Deaths		1	—				—	2		
Diphtheria	446	16	136	191	15	578	32	171	90	35
Deaths	11	1	—	1	1	10	2	2	3	—
Dysentery	123	16	101	1	—	89	18	71	—	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	—	—	—	—	—	3	—	1	—	—
Deaths		—					—			
Erysipelas			65	23	2			71	7	2
Deaths		—					1			
Infective enteritis or diarrhoea under 2 years				26					3	
Deaths	44	1	12	8	3	53	7	6	17	2
Measles*	8,870	155	471	25	188	546	67	18	58	—
Deaths	14	—	1	—	—	1	—	—	—	—
Ophthalmia neonatorum	52	2	15	—	—	60	2	11	—	—
Deaths										
Paratyphoid fever	6	—	—	—	—	5	—	1	—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal†	812	29	19	5	16	1,997	127	94	19	7
Deaths (from influenza)	35	1	2	—	—	464	56	23	10	5
Pneumonia, primary			359	46				535	22	
Deaths		41		13	9		99		22	21
Polio-encephalitis, acute	—	—				—	—			
Deaths		—					—			
Poliomyelitis, acute	6	—	1	2	—	6	—	—	1	—
Deaths		—					—			
Puerperal fever		3	8		—		3	17		1
Deaths										
Puerperal pyrexia‡	99	8	14	—	—	150	7	19	—	3
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,512	37	218	38	49	2,029	148	256	26	76
Deaths	1	—	—	—	—	—	—	—	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	4	—	1	10	—	7	—	—	8	3
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	1	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	1,179	43	53	61	11	1,509	171	73	43	23
Deaths	7	1	3	—	—	14	4	9	2	—
Deaths (0–1 year)	389	35	81	32	30	459	58	80	46	22
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	5,363	745	685	190	140	6,904	1,134	781	295	176
Annual death rate (per 1,000 persons living)			15·7	12·3	§			17·6	19·4	§
Live births	5,251	437	865	308	229	5,886	788	869	346	288
Annual rate per 1,000 persons living			17·6	20·0	§			17·7	22·7	§
Stillbirths	181	15	28			181	16	35		
Rate per 1,000 total births (including stillborn)			31					39		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

§ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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ANY QUESTIONS?

Bismuth for Osteo-arthritis

Q.—*Is there any evidence that bismuth is of value in the treatment of osteo-arthritis, and has it any advantages over gold? In the case I am interested in, both knees and the right hip are affected.*

A.—Bismuthi et sodii tartras has been extensively used for the treatment of yaws, and in view of the fact that in this disease rheumatic pains are often a feature and arthritic changes in the joints occur in the later stages, it was thought to be worthy of trial in other forms of arthritis. It was included in the *British Pharmacopoeia* in 1936. The published results of its use in this country in various forms of arthritis are as yet too scanty to establish its value, but it is said to be less effective in osteo-arthritis than in other forms. In the case which is the subject of this question the arthritis of the hip is probably the primary trouble, and the knee changes are secondary to it and due to abnormal strain setting up a chronic synovitis and later osteo-arthritic changes—a very unpromising type of case for any form of treatment; gold would almost certainly be useless. In other forms of arthritis the experience of the writer has been that the bismuth salt is definitely inferior to gold in the treatment of rheumatoid arthritis, but that where gold has been found ineffective or has produced toxic reactions the bismuth salt should be tried; the results, however, have not thus far been very encouraging. No harmful reactions have been met with in the comparatively few cases in which it has been used, and this would justify its further trial in these intractable conditions.

"The Four Humours"

Q.—*Patients frequently talk about their blood being "out of order" or "overheated," and thus explain, for example, children's spots. In the same strain they accuse themselves of "making too much acid," or say that everything they eat "turns to acid," with apparently no reference to hyperchlorhydria. What is the pathology, if any, to which they refer? What is the treatment, apart from the "cooling magnesia" which the patients usually prescribe?*

A.—The calorific value of a food depends on its content of protein, fat, and carbohydrate. After combustion in the body it leaves a residue which may be alkaline or acid. These data are tabulated in textbooks of dietetics, from which it will be seen that fats are heating and meat and cereals form acid. It is clear, however, that patients do not have these matters in mind when making the statements quoted. More probably we are dealing with garbled recollections of the humoral pathology which was first developed by the school of Cos (400 B.C.) but persisted well into the nineteenth century. Just as there were four elements in Greek philosophy (air, water, fire, and earth), so there were four qualities (moisture, cold, warmth, and dryness) and four humours (the blood, the phlegm, the yellow bile, and the black bile). Certain symptoms of disease represented the effort of the body to preserve life through coction or cooking of the altered fluids. The blood was warm and moist, like air, and sanguineous disorders were common in the spring. Sylvius (1614–72) added the notion that acid and alkaline elements were normally balanced in the circulating blood, and that illness was due to a disturbance of this equilibrium. He therefore distinguished diseases due to excess of alkali on the one hand and diseases due to excess of acid on the other, and advised treatment in accordance. Ideas of coction were much affected by Stahl's theory of phlogiston, which was conceived as the principle of inflammability, and subsequent developments led to treatment by powerful antiphlogistic regimens, particularly blood-letting and purgation. Many of us have childhood memories of brimstone and treacle every spring as a result of these hypotheses.

From a broader standpoint, it might be argued that an inherent weakness in the mental make-up of *Homo sapiens* is a tendency to form myths or irrational ideas about food. This constitutes an important chapter of Freudian psychology. Patients imply that it is their food which is overheating or turning to acid, thus revealing unconscious fears of poisoning, oral impregnation, etc. The modern fashion is to ascribe heat spots in children to food allergy or digestive disorder. Acid fruits, pork, breakfast cereals, chocolates, and sweets are forbidden and a mild aperient and alkalis are prescribed. Thus fashions may change, but in treatment we have not advanced far along the road beyond Sylvius and Stahl. Acidity, as distinct from heartburn or acid regurgitation, is a mythical malady. Acidosis was a common diagnosis in the first flush of biochemical medicine after the last war, and it is still the subject of propaganda by the manufacturers of proprietary salines. However, in the adult acidosis, acidosis occurs only in the presence of profound and obvious disturbances of bodily function. A more precise description of the sensation should be demanded from the patient. In some cases the symptoms of the syndrome of reversed peristalsis may be present—belching, nausea, biliousness, coated tongue, bad breath, etc. The cause may be a reflex dyspepsia or a mental disturbance. In both again an aperient may restore the normal gradient. If there is no physical counterpart of the complaint of acidity, a purely psychic disorder should be suspected.

Industrial Dermatitis in Coal-miners

Q.—*What are the causes of industrial dermatitis in coal-miners? How can one differentiate this condition from non-industrial dermatitis?*

A.—Among the causes of industrial dermatitis in coal-miners are acids and alkalis; grease and oil; cement (among "sinkers"). "Heat rashes" may occur where working conditions are hot and humidity high. Trauma is sometimes instrumental in determining the site of a dermatitis the primary cause of which may be one or more of the above. The differential diagnosis of industrial from non-industrial dermatitis calls for the same discrimination among coal-miners as with other "workmen." Of assistance in the differential diagnosis are a careful history with a knowledge of working conditions, and due appreciation of the significance of such points as occurrence and distribution of the dermatitis. Ringworm infections of the skin, which are favoured by heat and moisture, should be borne in mind.

Medicinal Treatment of Urinary Calculi

Q.—*How should one set about the removal of renal calculi by medicinal means? Is lavage of the kidney pelvis now used for removal of calculi in that situation?*

A.—There are two methods of treating renal calculi by "medicinal" means—the local application of solutions introduced into the renal pelvis through either a ureteric catheter or a nephrostomy tube; and the regulation of the reaction of the urine by diet and drugs. Apart from prophylaxis, these methods are used almost entirely for phosphatic stones, or even accumulations of phosphatic deposit which are only loosely bound into stones; for dense stones very prolonged treatment is required, and the technical difficulties are very great. A full description of the solutions used and the details of the method of keeping up the concentration of the solutions in the renal pelvis are given in a paper by Suby and Albright (*New Engl. J. Med.*, 1943, **228**, 81). From this it will be realized that constant skilled nursing is essential for success, but the results obtained should encourage others to try. There are many articles and books on the dietetic treatment of urinary lithiasis, but the basis of the method may be briefly stated thus: to produce an alkaline urine the diet should be mainly vegetarian, while an acid urine is obtained by giving a diet rich in proteins and fats but poor in sugar.

Intravenous Anaesthesia for Torn Perineum

Q.—*Is intravenous anaesthesia suitable for use in performing the repair of a torn perineum (presuming the patient's general condition is good)?*

A.—For primary repair of the torn perineum immediately after delivery local analgesia is unsurpassed and has the advantage of complete safety. It is also an extremely simple procedure and ideal for the practitioner working single-handed, since the anxiety of caring for an unconscious patient while occupied in inserting sutures into the perineum is eliminated. In cases where a general anaesthetic is given for the delivery—e.g., in forceps cases—there is no objection if the patient's condition is good, to continuing light general anaesthesia while the perineum is repaired.

General anaesthesia should not, in our opinion, be used in order simply to repair the perineum except in the case of a very severe tear involving the rectum. Here the repair is a major operative procedure and should be carried out under the best possible conditions. For such a case general anaesthesia is probably the best, but there seems to be no objection to the use of intravenous anaesthesia provided the usual precautions are observed—e.g., a good airway maintained and resuscitatory measures such as nikethamide available.

"Apple Diet" for Infantile Diarrhoea

Q.—What is the "apple diet" for diarrhoea in infants or children? How is it prescribed? What substances in the apple exert a therapeutic effect, and what is the action of each?

A.—Apple diet has been used effectively for acute colitis and sentery in children, and in infants for the later stages of diarrhoea en dehydration has been overcome but the stools remain offensive. w sweet apples are used, peeled, cored, and then grated, and the p mashed, each feed being freshly prepared. For a child of about year some 10 apples a day will be necessary. The equivalent of or 3 apples is given every 3 or 4 hours for 2 or 3 days. During is time all other food is withheld, but water must be given—2½ oz. r lb. body weight per day—sweetened if necessary with saccharine, r flavoured slightly as weak tea (without milk). A slow return to rmal diet is then begun. It is thought that "pectin" in the ple is the important agent, possibly acting by absorbing toxins or using some alteration in bacterial flora. It can hardly be said nat the scientific basis for what is essentially an old-fashioned Bavarian peasant remedy has been fairly established.

Anencephaly

Q.—After bearing a normal female child, now 6 years old, a woman produced in two successive pregnancies an anencephalic monster, the first of which apparently died 3 weeks before delivery. In the second case the pregnancy was terminated 1 month early, as the mother was suffering from high blood pressure and albuminuria. So far as can be ascertained there are no abnormalities in the woman's family, and no intermarriages have occurred as far back as can be traced. Her husband's paternal grandparents were first cousins. A sister of his suffers from epilepsy, but apart from some deafness and another sister who had rheumatic fever, the medical histories of his close relatives are good. After the second anencephalic monster was born a blood examination was done, with negative result. What are the chances of a normal child resulting from any future pregnancy? The husband has asked my opinion on the advisability of sterilization of himself or his wife.

A.—As many as three successive anencephalic monsters have been born to normal parents, and it is quite possible that the next child may be anencephalic. The chances of its being normal cannot be stated with certainty. Sterilization of either the father or the mother inadvisable. One objection to it is that, if either parent died, the other might marry again and wish to have children.

Fungus on Tongue

Q.—A man 38 years old has had for 10 years at least, possibly more, a thick yellowish-green fur on the dorsum of the tongue. He was told by an eminent Italian physician that the condition was due to an over-abundance of fungus which is normally present on the tongue. Is this a correct explanation? Is there any treatment? I have not been able to find any description of such a condition in the literature.

A.—Apart from pathogenic fungi, such as *Candida albicans* (the common thrush fungus), which may cause a specific mycotic glossitis, moulds and yeasts are sometimes found, especially when the toilet of the mouth has been neglected, vegetating saprophytically on small collections of food material and epithelial detritus wherever this matter remains undisturbed. Certain conditions of the surface of the tongue, of which "hairy" tongue is an extreme example, favour the accumulation of such detritus, which is almost invariably associated with the presence of saprophytic yeasts or moulds. In course of time, but probably rarely, the saprophyte may become adapted to a semi-parasitic life and attach itself to the superficial strata of epithelium, from which its removal by mechanical means alone is no longer possible.

Local treatment by frequent swabbing or gentle brushing with fungicidal substances is necessarily experimental, but solutions of permanganate of potash, hypochlorite of soda, peroxide of hydrogen, diluted Lugol's iodine solution, or weak solutions of methyl violet or fuchsin may be tried. It would, however, be desirable before beginning treatment to determine, by microscopical examination of scrapings, that, in fact, the condition is caused by a fungus and, by isolation in culture, to identify the fungus.

Vaccination of an Allergic Subject

Q.—A boy aged 12 years, subject to attacks of asthma and dermatitis from infancy, has not yet been vaccinated. Is there any danger in doing so?

A.—This boy is allergic, and allergic reactions, usually in the form of rashes (erythema multiforme or morbilliforme, urticaria), may occur after vaccination. The incidence of these non-specific rashes after vaccinia is small (1: 5,000 to 1: 9,000), and they have not apparently been correlated specifically with allergic subjects; but the nature of the rash and its usual occurrence 8 to 12 days after vaccination suggest an allergic aetiology, ascribed by some workers to the small amounts of ox serum in the vaccine lymph. Another disadvantage of primary vaccination in a boy of 12 is that the reaction is likely to be severe, and post-vaccinal encephalitis, although a small risk (1:20,000 to 1:700,000), occurs most often after primary vaccination in children of school age. It would therefore seem inadvisable to vaccinate the boy unless or until he is exposed to the risk of smallpox. In such a case the multiple-pressure method would be preferable to the scratch method (see Parish, H. J., *British Medical Journal*, 1944, **2**, 781).

Adult Stammering

Q.—Is there any possibility of complete cure of stammering in a male aged 33 with a history of frequent illnesses in childhood? Two years' service in the R.A.F. (ground staff) has greatly increased the stammer. Is treatment best undertaken by a speech therapist or by a psychiatrist, and what are the methods employed?

A.—If the stammer has existed since childhood a complete cure is very unlikely in an adult of 33. Considerable improvement is possible; at least he should attain his pre-service level and might improve even beyond this. The fact that R.A.F. service has intensified the stammer suggests some degree of "psychoneurotic superstructure"; consequently the best line of treatment would be psychotherapy (by an appropriate psychotherapist) and also speech therapy (by a speech therapist). Speech therapists are now recognized as "medical auxiliaries," a diploma being granted to properly trained speech therapists by the recently constituted College of Speech Therapists. Psychotherapy does not necessarily mean psycho-analysis, but a modified form designed to bring about psychological readjustment as practised by many psychologists.

Pyruvic Acid

Q.—(a) What is pyruvic acid? (b) Why is it so named? (c) Under what conditions or where in Nature is it found? (d) In what way does it neutralize the effects of vitamins B and D? (e) Is it known to have any other action? (f) Does calcium neutralize its ill effect, or is any substance known that does so?

A.—Pyruvic acid or acetylformic acid has the formula $CH_3.CO.COOH$, and is so named because it is obtained by the action of heat ($\pi\tilde{\upsilon}\rho$ = fire) on tartaric acid, which is found in grapes (*uva* = a bunch of grapes). It is an intermediate product of carbohydrate metabolism and is probably formed in the tissues by the anaerobic oxidation of glucose according to the following scheme: Glucose → hexose mono- and di-phosphate → phosphoglyceric acid → phosphopyruvic acid → pyruvic acid. It is found in the tissues, blood, and urine. There is no evidence that it neutralizes the effects of vitamins B and D. Vitamin B_1, however, in the form of its phosphate (cocarboxylase) catalyses the decarboxylation of pyruvic acid to methyl glyoxal, $CH_3.CHO$. A complex of protein, vitamin B_1 pyrophosphate, and magnesium also carboxylates pyruvic acid to oxalacetic acid, $HOOC.CH_2.CO.COOH$. Pyruvic acid is a product of metabolism and is not known to have any specific action. In patients with vitamin B_1 deficiency it is stated that the blood pyruvic acid is elevated, although this has been disputed. Some of the symptoms of vitamin B_1 deficiency have been ascribed to the accumulation of pyruvic acid in the body. Calcium has not been shown to have any effect on the pyruvic acid level in the body. If the latter is raised and is associated with vitamin B_1 deficiency, administration of vitamin B_1 brings the blood pyruvic acid down to normal levels. The blood pyruvic acid is also raised in insulin hypoglycaemia, hyperthyroidism, and mild diabetes.

Hydatidiform Mole

Q.—What is the present state of knowledge of the hydatidiform mole? Textbooks seem to repeat an age-old formula. Is anything known of the aetiology? How soon after evacuation may a further pregnancy be permitted?

A.—Hydatidiform mole is believed to be due to a developmental anomaly of the trophoblast of the young ovum. Just as such defects as anencephaly and spina bifida involve the tissues derived from the embryoblast, so does hydatidiform degeneration attack the trophoblastic tissues. The parallel may not be exact, but the principle of a developmental anomaly of the chorionic tissues holds. The cause is, of course, unknown, nor can any predisposing factors be distinguished. The morbid histology is also unsatisfactory, for there is no explanation of the method of formation of the vesicles. The proliferation of the cytotrophoblast leads to profound alterations in the endocrine balance, so that the ovaries become cystic and the excretion of chorionic gonadotrophin in the urine is greatly increased. As the fault lies in the ovum there is no objection to a subsequent pregnancy at an early date. An interval of four to six months might be suggested. There is much to be said for determining the Aschheim-Zondek reaction of the urine during the interval to exclude the development of chorion epithelioma.

Allergy to Citrus Fruit

Q.—*Last autumn and this I have frequently noticed crops of vesicles in infants and young children, on arms, legs, and sometimes the body. Attacks tend to recur over a period of weeks or months; the vesicles are usually irritable, start as red spots, then become blisters, and gradually disappear; they may reappear in a week or so; size 1/8 in. to 1/4 in.; they may become pustular. Mother and clinic usually blame oranges. What are the aetiology and treatment, and does diet or vitamin deficiency play a part in causation?*

A.—The description does not give enough detail to allow of a definite diagnosis, but the occurrence among a number of young children suggests a common factor, and if an unusual form of urticaria can be excluded, and such parasitic conditions as scabies, then it is not unreasonable to suspect oranges, because the citrus fruits are well known to cause allergic reactions of different sorts.

Occupational Cause of Leukaemia and Raynaud's Disease

Q.—*Is there a recognized occupational cause of (a) leukaemia, (b) Raynaud's disease?*

A.—Leukaemia is not generally recognized as a direct occupational disease, but it has been noted as the final phase in some cases of aplastic anaemia following exposure to benzol, and occasionally to *x* rays. A recent case of chloroleukaemia reported in a German benzol worker, for example, was considered to be related to his exposure in so far as the benzol might have had an initial aleukaemic effect followed by over-compensation of the bone marrow leading to leukaemia. (For leukaemia associated with benzol see Weil, P. E., *Bull. Mém. Soc. méd. Hôp. Paris*, 1932, **48**, 193.)

True, Raynaud's disease is not recognized as an occupational condition, but "dead hand" is known as a relatively frequent occurrence in workers using the compressed-air hammer. This is believed to be a local condition due to the concomitant action of cold (partly arising from the compressed air escaping from the tool) and of long-continued muscular contraction and transmitted vibration. (See Leys, D., *Lancet*, 1939, **2**, 692; and Desoille, H., 1937, *Ency. Méd. Chir.*, vol. 8.)

Romberg's Sign

Q.—*What is the mechanism of a positive Romberg's sign? In what conditions is it found? Where can one read Romberg's own description of this sign?*

A.—Romberg's sign is used to demonstrate a defect in the ability to maintain posture. The ability to stand upright with the eyes closed depends upon the afferent impulses from joints, tendons and muscles, and skin. Some of these impulses make the subject conscious of where his limbs are and where his body is in regard to his limbs. Some do not reach consciousness but nevertheless help in the maintenance of posture. All these impulses are co-ordinated and the resulting pattern of nervous activity maintains the postural muscles in the appropriate tonic state, through the efferent nerves. A lesion anywhere in the pathway will give rise to a defect in maintaining posture—for instance, a man with weak muscles cannot stand upright efficiently. Usually, however, the defect is in the sensory, afferent fibres, when inability to maintain posture, giving a positive Romberg's sign, is associated with loss of joint sense. The sign is therefore found in diseases where this defect occurs—for example, tabes dorsalis, disseminated sclerosis, or peripheral neuritis. Romberg's original description appeared in the *Lehrbuch der Nervenkrankheiten des Menschen* (Berlin, 1853), and a translation by E. H. Sieveking appeared in the *Transactions of the Sydenham Society*, London, 1853.

INCOME TAX

Expenses of Employment

A. S. has been employed by the Ministry of Health, it being a condition of his employment that he should attend a course of study and sit for a specified examination. Can he claim a deduction for the study and examination fees?

*** The governing rule is that an expense can be deducted if it is incurred wholly, exclusively, and necessarily in the performance of the duties of the office or employment. The benefit to be derived from the study and the examination in question—e.g., the increase in knowledge and skill, and evidence thereof—will extend into the future, and though A. S. can presumably show that the expense was necessary in that only by complying with the condition could he continue to hold the appointment, it is, we consider, unlikely that he could establish the contention that it was incurred wholly and exclusively in the performance of the duties of his present employment. We cannot therefore advise him to appeal against the view taken by the inspector of taxes.

LETTERS, NOTES, ETC.

Oxalated Blood for Cell Counts

Dr. C. J. C. BRITTON (London, W.1) writes: The answer given under this heading in the issue of Dec. 2 (p. 744) appears incomplete. It omits to mention the very important point of the amount and type of oxalate used. The ordinary oxalate tube, as usually employed in the collection of blood for biochemical tests, contains so much oxalate that a very hypertonic fluid is inevitable, and the results found on delayed counting of such blood are grossly inaccurate, as your correspondent states. If, however, the tubes for collecting the blood are prepared in such a way as to avoid this—e.g., if they contain a mixture of exactly 4 mg. dry potassium oxalate and 6 mg. dry ammonium oxalate for each 5 c.cm. of blood taken—it will be found that the estimation of haemoglobin, the red cell count, and packed cell volume are reliable if performed within 24 hours in temperate climates, or within 2 to 3 days in cool weather. The leucocytes are much more easily damaged and destroyed, and there is commonly about 10% destruction of these cells in 24 to 36 hours. Blood films must always be made when the blood is first collected.

Growth on Ear

Dr. F. S. AIREY (Leicester) writes: I believe your inquirer would find a more precise reply of greater assistance than the one quoted by you (Nov. 25, p. 714). Chondrodermatitis nodularis chronica helicis, as first described by Winkler (painful nodule of the ear), is a clinical entity commonly encountered. The aetiology is obscure, but the lesion occurs mostly in middle-aged men (although I have seen it in a young boy) and always chooses the rim of the pinna. It is essentially a corn, being dependent upon the development of a cartilaginous outgrowth in response to intermittent pressure (perhaps from the hat brim, but more likely the pillow in bed). The visible, palpable "wart" is a nodule of fibrous connective tissue which recurs after simple excision. Usually it is radio-insensitive. Permanent relief cannot be achieved without removal of the underlying cartilaginous spur. It is important not to limit excision to the actual nodule or a prominence will be left at each end of the scar and favour the development of secondary lesions. It is wise to strip the cartilage (not, of course, deeply) over an inch or so of the rim of the helix so as to avoid further trouble. The slight disfigurement resulting is accepted by most patients as of trivial consequence.

Insect Sprays in Sleeping Quarters

Dr. A. H. DOUTHWAITE (London, W.1) writes: With reference to your recent correspondence on the subject (Dec. 30, p. 874), it may interest your inquirer to learn of one instance in which "flit" appeared to produce toxic effects. An over-zealous housemaid had sprayed the bedroom profusely shortly before bedtime. No precaution had been taken to prevent the droplets falling on the pillow. The windows were opened just before the occupants got into bed. Both of them suffered from dreams of violent action, terrifying apparitions, and other features similar to those produced by deliriants. They awoke within an hour with headache. On changing the pillows and leaving the door open the smell of the fluid soon vanished and the rest of the night was peaceful. A year later the same train of events occurred. Other members of the household in unsprayed rooms did not suffer. On both occasions they had all eaten the same dinner. Presumably the volatile solvent was responsible.

Colt or Filly?

Dr. J. HOBART NIXON writes: Dr. L. Kilroe is correct in his doubts about Rocksand's female impersonation: the race mentioned should have been the St. Leger, not the Oaks.

Corrigenda

There was an inadvertent omission from the report of a case of locked twins received by airgraph from Dr. B. A. Bradlow of Johannesburg and printed in the *Journal* of Oct. 21, 1944 (p. 533). After the words "... delivered this twin as a breech presentation" the report should read: "The infant was a female weighing 5 lb. 3 oz. and only had slight blue asphyxia. He then did an internal version, turning the second foetus into a breech, and delivered it in this position. This infant was also a female, weighing 4 lb. 4 oz., and like its sister exhibited only slight blue asphyxia."

On page 57 of the *Journal* of Jan. 13, in the account of a meeting of the British Orthopaedic Association, Col. Stark (New Zealand A.M.C.) was given as one of the speakers. This should have been Col. Stout.

Disclaimer

Mr. HAROLD DODD wishes to disclaim any part in the publication in a weekly periodical of an extract from his article on varicose veins which appeared in the *Journal* of Dec. 23.